Better Crops with PLANT FOOD

September 1927 10 Cents

The Pocket Book of Agriculture

Every Useful Magazine Has a Sound Policy

THE policy of BETTER CROPS WITH PLANT FOOD is definite. It is to stimulate an interest in all factors pertaining to more efficient crop production and to give accurate information on such subjects.

In developing a more efficient agriculture, you believe — as we do — that one of the most important factors is sound research and experimental work. It is our policy, therefore, to actively support all groups and agencies doing such work, especially the State Agricultural Experiment Stations and Colleges and the United States Department of Agriculture.

We believe that such research work is of the greatest value when translated into more efficient production and better living on the farm. Agriculture should be put on a business basis. The farmer is entitled to a larger share of the consumer's dollar. One sure way of getting it is to cut the cost of production. Consequently we are glad to heartily support the work of the agricultural extension forces and the county agricultural agents who are working toward that end.

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This magazine is your forum. The editors will be glad to hear from you or see you at any time at the editorial offices, 19 West 44th Street, New York City.

Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*
Editorial Offices: 19 West 44th Street, New York.

VOLUME IX NUMBER FOUR

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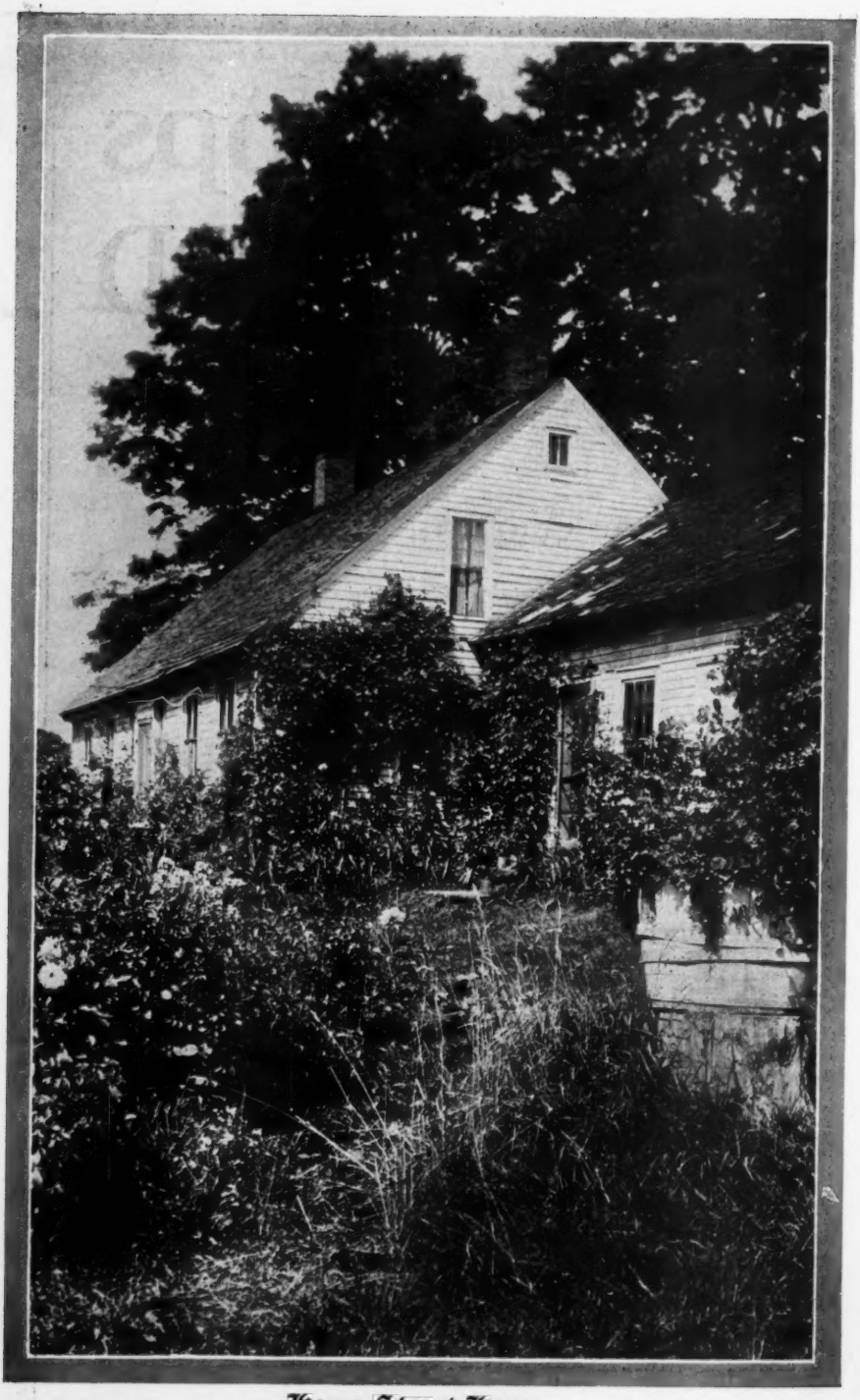

Home Sweet Home

Better Crops with Plant Food

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¶ *This is the season for partaking of red lemonade, hot dogs, and cracker-jack*

FAIRS

By Jeff McDermid

FAIRS reflect human traits and as this is the season when our energies are spent upon fair-making and fair-going, methinks it is time well spent to ponder upon them. My earliest cognizance of the word *fair* had to do with the emporium kept by one Isaac Burnstein on Main Street in a somnolent mid-western village. The *fair* store was the shopping place of the countryside and had attractions for the boy with a bit of spending money on the Fourth of July or at Christmas. Mother got her jelly glasses there; Father sought it regularly for his bandanna handkerchiefs and red flannels; and its cracked mirror reflected me in my first pair of long pants.

When next I heard of fairs it was in my romantic years when I used to read *Vanity Fair* or listened to a garrulous Hibernian neighbor repeat the tales of turmoil and cudgeling so common at Donnybrook in the brave days of old.

SINCE my maturity and its attendant close connections with fairs as we really know them here, I have observed that those three kinds of fairs that caught my childish attention contained the main ingredients that make up the modern show fes-

tival of our autumn season. Let's note the resemblance.

First, the present-day fair is an exhibit of wares and equipment intended to pry open the family purse—even as the "fair store" aimed to do. It is as much to *sell* to farmers as to *sell agriculture* to the public that many of the fairs are operated.

Second, a display of vanity, vainglory, and pride in achievement—many losers for every winner—just like the background for Thackeray's classic.

Third, a scrap for position and honor, a tussle for a moment's place in the sun, even at the risk of a little jockeying and rough work, reminiscent in part of the Donnybrook fracas.

FAIRS are almost as old as goodness and meanness, and I suspect that Adam held a fair soon after he got settled following the w. k. eviction—providing the crops turned out well. If Noah missed staging a carnival with his caravan, it was simply because the grounds were too damp.

At any rate, the tomes of history tell us that the Phoenicians had great carnivals and commercial fairs, while the bazaars of the Orient were the precursors of the hootchie-kootchie and the inspiration for the blatant streets of Cairo, both once inseparable from the modern midway. The Russians on the famous fairgrounds at Nishni-Novgorod began a series of community festivals long before Christopher Columbus discovered our precious land of pumpkin shows and cracker-jack.

However much the Irish may have contributed to the battle element in fair tradition, it was left for their neighbors, the braw Scot and the bluff Briton, to set the pattern for the truly rural livestock fair as we now see it at its best. The followers of Cruikshank and Cobban set the pace in the eighteenth century for the type of agricultural fair which George Washington encouraged, and upon which so many of our tawdry carnival troupes have since tried to infringe.

GIVEN a natural Scotch ancestry, our fairs should partake of the characteristic thriftiness that is so often used as a bon mot on the kilt-clad stockmen.

But do they live up to it? As a rule the fair boards either raid some public treasury for all it will stand or assess a local commercial club to make up the deficit. The annual fair subsidy created in the name of agriculture, but largely spent upon circus attractions, costly fireworks, and decorations, amounts to a huge sum.

If this goes on for another decade or two, with hamlets in rivalry with cross-roads, county pitted against county, state against state, what limitations are to be placed on the budgets?

Maybe Charles Dawes and the "old briar Hell and Mariar" will have a job cut out for him as finicky and perplexing as the one he tackled at the Ruhr. Perhaps America needs an exposition commissioner in the president's cabinet.

We have regulated transportation, child labor, immigration, and beverages—and we may have to assume full public responsibility for amusements next.

THIS brings us up short against the real question that must first be raised: Are fairs amusements or educational institutions? Perhaps they signify progress administered to the unwilling populace in homeopathic doses of sugar-coated pills.

One person says they must be amusements, for the posters display the pyrotechnic panoramas and grandstand tumblers, with nary a line about the cows and cabbages.

Yet the anxious fair secretary, appearing before the civic club or the senate finance committee, avers with unblushing astuteness that the yeomen

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William C. Stallings (center) appointed in 1906 as the first county agent in the United States, and W. F. Proctor (right) selected in 1904 as one of the first extension workers in the field, shown here with one of the first organized boy's corn clubs.

The COUNTY Agent

¶ Ten years have worked wonders in agricultural extension work

By Frank George

U. S. Department of Agriculture

THE county agricultural agent system has developed in the past 10 years from a wee thing to the world's greatest agricultural extension agency. No other country has anything that begins to approach in efficiency this organization which is credited with much of the agricultural progress made in the United States.

Although the county agent system as now organized dates back only to 1914 when the Smith-Lever Act was passed, county agents or itinerant agricultural teachers had been appointed in many states prior to that time. The movement originated in the South in 1903, but by 1914 it had spread to other regions, North Dakota in that year having 14 county agricultural agents or more than any other state outside the cotton belt.

J. A. Evans, now assistant chief of

the office of cooperative extension work in the Department of Agriculture, and W. F. Proctor were appointed in 1904 to do farm demonstration work in combating the boll weevil. Subsequently, in 1906, William C. Stallings was the first man to be appointed a county agricultural agent, his territory being Smith county, Texas.

By July 1, 1914, two months after the passage of the Smith-Lever Act, 718 counties in the 15 southern states and 210 in the remaining states in the North and West had agents. Seven states had no county agents and only two had a full quota. On July 1, 1924, there were 2,084 counties with agents. All states had county agents and five states had a full quota.

Three Out of Four

A STATISTICAL measure of the far-reaching influence of the extension service in improving farming practices was developed in a survey recently of 3,954 farms in Iowa, New York, Colorado, and California. The farms constituted 94 per cent of all the farms located in typical areas of seven counties in the four states. It was found that on 74 per cent of the farms, or in the case of practically three farms out of four, extension effort had brought about the adoption of one or more improved practices.

It was freely predicted in 1900 that cotton production in the United States would be completely wiped out unless the boll weevil was checked. Early attempts to control the pest, such as burning the cotton stalks, proved ineffective. It was discovered that the fight on the weevil had to be one of adapting agricultural practices to raising cotton under boll weevil conditions rather than extermination of the pest. The county agricultural agent was developed to carry on such demonstrations. He turned defeat into victory. Cotton is still the basis of southern agriculture.

Western farmers 10 years ago believed that corn could not be adapted to that territory. Experiment station tests proved that corn of certain varieties could be produced there. The result has been that the corn area in 11 western states has been expanded from 793,000 acres in 1914 to 2,637,000 acres in 1923. Introduction of corn made dairying and livestock feeding possible; the whole system of farming was changed.

Increasing Corn Yields

IN 1917 a wet fall and early frost followed by warm weather caught much of the corn immature in the northern and western states. The northern part of the corn belt was practically without corn that could be used for seed. To meet the situation many county agents established special stations for testing corn. Surplus seed of good quality was conserved and made available to farmers who had none.

In the fall of 1917, county agricultural agents in that territory obtained the field selection of seed on 63,813 farms, which provided seed for planting 3,466,986 acres in 1918. Through testing campaigns in the spring of 1918, 547,779 farmers tested seed corn for germination and provided seed for 10,605,894 additional acres. More than 1,000,000 bushels of seed were obtained from other sources for 222,123 farmers. Not only was the situation saved but 500,000 additional acres of corn were planted in the spring of 1918, resulting in an increased production of 12,820,300 bushels.

Varietal standardization of grain has been an important service rendered by county agents that has made agriculture more profitable. Formerly, hundreds of so-called varieties were grown, usually from 10 to 20 in each community. Variety tests of local varieties planted alongside strips of pure seed were made by county agents. As a result of such tests, field demonstrations, and campaigns, and through the establishment of reliable sources of seed, whole communities or regions

have discarded the old mixtures and are growing one approved variety particularly adapted to local conditions.

J. C. Arthur of Purdue University discovered in 1890 the value of formaldehyde treatment in the control of oat smut. More than 25 years passed before farmers in the oat belt were induced to use the practice, and then only through the efforts of county agents. In Benton county, Ind., the county adjoining the experiment station, the first county agent to take up the work could find not a single farmer treating his seed oats. A few years later, more than half the farmers were testing their oats for smut. A similar situation existed throughout the oat belt.

New Strains Introduced

THE Kansas Agricultural Experiment Station in 1914 began the distribution of Kanred, a Crimean variety of wheat which had been developed by years of careful head selection and breeding. A survey in 1918 showed that 80 per cent of the total acreage of Kanred was being grown in the 42 counties having extension agents In 1924, some 4,000,000 acres were grown in Kansas, or nearly half the total winter wheat acreage. To the introduction of Kanred by the extension agents is attributed the upward trend in the yield per acre in more than half the counties of the State.

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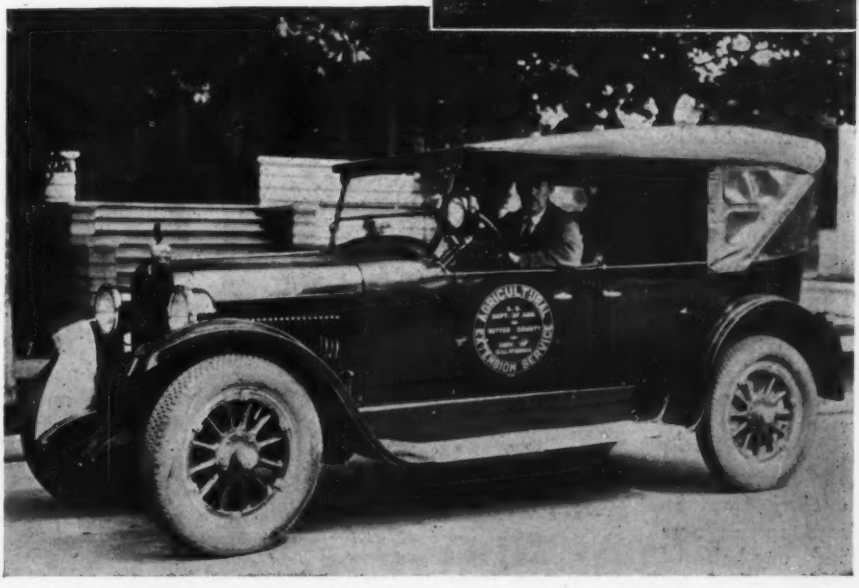


The first county agents travelled about their counties on foot, on horseback, and by horse and buggy. The modern county agents such as the one below use a much faster method. Good roads and automobiles greatly facilitated the work of the agents.

CORN CUTTING *is taken out of the class of back-breaking labor*

Number VIII in our series

*Un*bending

BRING sickles to reap, or blades to strike.
Before they have lost
In the sun and frost
The nourishing juices the cattle like,
Sucker and stalk must be cut from the hill
Surround them, and bend them, then hit with a will!
Left standing too long,
They grow woody and strong;
The corn in the stook will ripen still.

SO wrote the poet before the coming of the miracle of modern corn harvesting machinery. Were he writing today he might, instead, be inspired to sing the paeans of praise to the mechanical marvel which at the same time cuts, bundles, and binds the corn ready for shock or silo.

Because of the saving of time and labor made possible by its use, a corn binder is practicably indispensable on every farm producing substantial acreages of the King of American field crops. It has been estimated that while one man is cutting from an acre to an acre and one-half of corn by hand, one man with a binder will cut and bind five to seven acres.

Corn was the earliest, as it is often the most important, cultivated crop on the American farm. When the first Colonists settled, they found the Indians producing corn from which they made various kinds of food.

The first corn grown by white men was produced in the Virginia Colony, at Jamestown, in 1608. It is not unlikely that the Indians taught the settlers how to plant and cultivate the crop. Almost the sole food supply of the colony for that first winter of hardships was obtained from the corn harvest.

Corn cutting was back tiring work even with a sharp blade and strong right arm.

It is not probable that it took long to discover that just as the ear was good for grain the leaves and stalk were fine fodder. So as a stock food, both the ears and the stalk of the corn plant have been used from the earliest times.

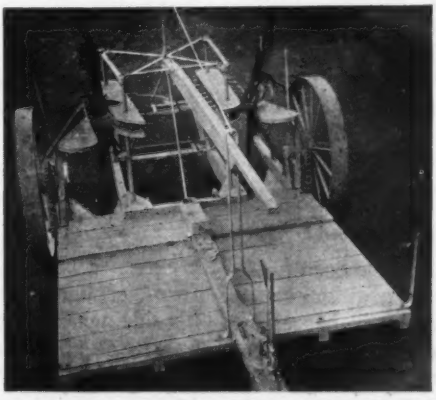
Topping or stripping the leaves was one of the first known methods of harvesting corn. The farmer, with a sharp knife, walked along the

By M. L. Hopkins
Madison, Wisconsin

Backs *in* FARMING

rows of corn, cutting off the tops just above the ears. He also stripped the leaves from that part of the stalk left standing.

The tops and the leaves thus cut off were laid in small piles to dry, after which they were tied into bundles. These bundles were then set up in small shocks and left until the fodder was sufficiently cured, when they were hauled away and stacked near the feeding place. This corn, considered very valuable, was used for feeding the horses and the oxen in the spring before the grass came.



Long corn rows seemed shorter when viewed from a moving platform equipped with blades to do the cutting.

Because the corn plant dried before the ears were mature, the leaves were stripped while still green. This procedure necessarily resulted in a small corn yield.

The unsatisfactory results which followed corn topping and stripping led the search for a better method of securing the fodder. Cutting the stalk close to the ground at a time when no damage is done to the ripening corn answered the needs. It is not entirely surprising that the hoe was the first implement used for corn cutting nor are we startled that it proved to be too crude, heavy, and awkward.

Scythe Replaces Hoe

SHARPENED blades, some of which were scythes, soon replaced the hoe, for with these it was possible to cut three times as much corn, and with less back-breaking. One type of corn cutting knife was fastened to the shoe. This was then pushed with considerable force against the stalks. But despite the elimination of the tiresome stooping over with the shoe cutter type, the process was a laborious one.

Besides being back - breaking, cutting by hand of necessity delayed harvesting at a season when many other duties demanded attention. Moreover, it was found that corn cut by hand was hard to handle, because it was next to impossible to pitch the stalks with a fork. About the only way loose cornstalks can be handled is in armfuls, which adds to the labor of handling. Furthermore, it is necessary to have small loads, for it is out of the question to throw an armful

The corn binder may prove an ally in the struggle to conquer the corn borer.

of unbound stalks onto a high load.

For years we have had machines which successfully harvest, thresh, and clean the small grains, so that every part of the plant may serve some useful purpose. The machinery for the care of the corn crop, however, has seemingly been much more difficult to develop than any other line of farm implements.

Gradual Development

BEGINNING with the corn knife, an instrument in common use on small farms today, corn harvesting machinery has developed through the single row sled cutter, two-row corn cutter mounted on wheels, the corn harvester, the binder, and the machine that cuts the stalks in the field ready for the silo.

As early as 1820 attempts were made to construct a mehanical corn harvester. From that time until 1892 apparently all of the inventions were failures, for although the machines were patterned after the mower and the reaper, they either would not cut at all or they broke under the heavy strain.

In the meantime the sled harvester, a home-made device, was being improved from time to time. With most of the early sled harvesters, the driver rode on the platform, where it was necessary for him to gather the stalks in his arms in advance of the cutting edge, so as to prevent them from falling in all directions. The process proved to be a back-breaking one.

By mounting the harvester sled on wheels a decided improvement was effected. This type cut two rows at a time. Two men sat upon the platform, each one guiding the corn on his side against the cutting edge with one hand and with the other hand placing the corn into position to form a shock. When enough corn had been collected to make up a shock, the stalks were tied together and the side platform so tilted to deposit it on the ground in an upright position.

Back-breaking Exercise

THE corn harvesters were rather useless when the corn was tangled and lodged, because the machines work most effectively when the corn stands straight and the horse walks rapidly. It is needless to state that the process of gathering the corn after the sled harvester preparatory to

Power and machinery now cut, bind, and elevate the corn to silage wagons.

shocking it gave the farmers considerable back-breaking exercise.

The cutter sleds, and machines of similar construction, were gradually substituted by harvesters and binders which cut the corn and deposited it in bundles, tied or loose, or even delivered the stalks to the loading wagon.

The credit of inventing corn-harvesting machinery belongs to Edmund W. Quincy of Illinois, as he obtained the first patent on a corn-harvesting machine in October, 1850.

The principle in corn harvesters and binders which was destined to prevail was invented by A. S. Peck, of Geneva, Illinois, and patented January 5, 1892. The principle consisted of a machine with two dividers passing on each side of a row of corn. The dividers consist of two diverging jaws opening at the front of the machine. Attached to each jaw are two or three traveling chains, which bring the stalks to an unright position and carry them back to the binding deck.

It is being claimed, today, that the first truly successful binders, placed on the market in 1895, were Deering and McCormick machines.

Thousands of farmers during the last few years have increased the profit from their corn crop by harvesting the whole plant—stalks, leaves, and all. Properly harvested corn fodder is a nutritious summer succulence, yet there are countless farmers who still snap or husk their corn in the field, letting the stalks and blades go to waste.

Despite the fact that corn harvesting machines are not, as yet, complete, the labor-saving devices are so well developed that corn may be cut, husked, and shredded with less hand labor than the cutting, alone, formerly required.

With the continued development in improved types of corn binders, corn of any size can be cut and tied or dropped in loose bundles as desired. Bundle carriers on the binders are so constructed that they collect several bundles, then drop them in windrows. The bundles can be conveniently shocked in rows or they can be hauled directly to the silo from the windrows.

The latest improvements on the corn binders eliminate chance of breakage caused by clogging. For instance, the manufacturers of the John Deere claim for their machine that it has a shaft that drives the apron, on

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Fruits, Nuts, *and* Fertilizers

By B. E. Maynard

San Jose, California

B. E. WALKER, who resides a few miles out of San Jose, has been engaged in fruit growing in the Santa Clara valley for nearly 40 years. Almost as many years ago, he began using commercial fertilizers in orchard work, and many interesting facts concerning their use have come under his observation during that time.

Mr. Walker not only is a practical and successful fruit grower, but a close observer and student of horticultural matters, always delving carefully into such matters as cover crops, cultivation, pruning, spraying, fertilization, irrigation, and any other treatment that may have a bearing on the welfare of his trees. His experiences with the use of fertilizers in orchard practice are of more than passing interest.

Early in his work he became convinced that the best paying returns were to be obtained only by the use of a well balanced complete fertilizer —that is, one containing all three of the essential ingredients, nitrogen, phosphoric acid, and potash. Thirty years later this is still his unshakable belief, fully upheld by his experiences during recent years.

The story of the beneficial results he has obtained from the use of commercial fertilizers as he related it in his quiet, unassuming way, certainly carried conviction with it, and clearly demonstrated why he has such unshakable faith in their value when properly used. Mr. Walker does not confine himself to the use of commercial fertilizers only, but uses barnyard manures to a considerable extent and regularly turns under a legume cover crop of some sort. However, he has proved to his own satisfaction that cover crops and barnyard manures do not meet the full plant food requirements of his place, but that it pays him well to supplement them with fertilizers well supplied with phosphoric acid and potash, also containing a moderate amount of nitrogen.

Prunes and Peaches

WHEN he first started fertilizing, Walker used a formula containing 3 per cent nitrogen, 10 per cent phosphoric acid, and 10 per cent potash. Thirty years later he still finds that this formula meets the general conditions of his place better than anything he has applied. This formula contains enough nitrogen to give all the renewal necessary, plenty of phosphoric acid to insure proper setting and ripening of the fruit, and potash in sufficient supply to fill the fruit with sugar, plump it out, maintain quality, and promote health and hardiness in his trees.

However, on his prune trees where wood growth was excessive, the fruit of poor quality, shrinking heavily in drying, and the flesh of the dried product of a dull blackish color, he omitted the nitrogen entirely, using a fertilizer containing 10 per cent available phosphoric acid and 10 per cent potash at the rate of 10 pounds per tree. This treatment proved most successful, greatly increasing production. The sugar content of the fruit was increased, which meant lower shrinkage in drying, with the flesh of the finished product of a clear, rich, golden hue free from the undesirable blackish color formerly produced and still produced in near-by orchards. Thus as far as his prunes were concerned, potash and phosphoric acid met every food requirement.

On his Tuscan cling peaches, how-

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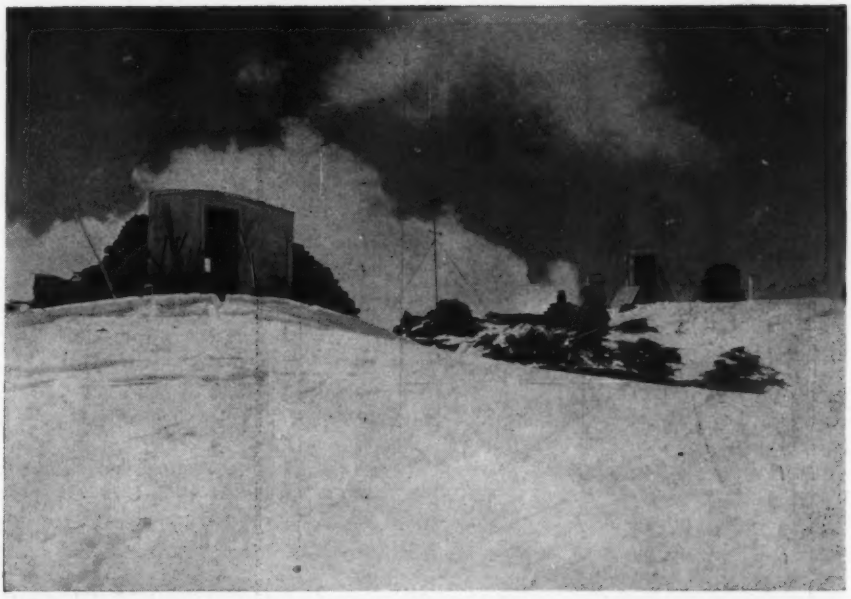


The Mt. Rose Observatory at the crest of the mountain (elevation 10,800 feet).

Nevada

EDITOR'S NOTE: *Nevada, the sixteenth state visited in our journalistic tour of state agricultural experiment stations, offers information on a comparatively new project that is being recognized as of vast importance to irrigated farming in a number of states of the Union and in the provinces of Canada. This work, in connection with the snow survey measurements of water in the mountains, which serves as storage material for irrigation water during the summer, is described to us in the following article by Dr. J. E. Church, Jr., who has charge of this unusual research.*

UP to very recent years, Nevada has been primarily a stock-raising state. Sheep and cattle from ranch and range have constituted the leading agricultural output of the State. Nevada's agriculture has, therefore, presented special problems, and for many years past most of the station work has centered around the problem of animal disease, poisonous range plants, and kindred problems of the livestock industry.

There are many interesting agronomic and soils problems to be studied in Nevada and with the development of small farming in place of large scale ranching, studies of the more conventional types will be undertaken.

Founded in 1887

THE Nevada Agricultural Experiment Station was founded in the year 1887. Until the year 1912, the following named presidents of the

The timber line on Mt. Rose (10,000 feet elevation). The snow is as deep as the sampler is long. Compare the length of the sampler with the height of the observer.

University of Nevada served also as directors of the Experiment Station: Leroy D. Brown, Stephen A. Jones, and Joseph Edward Stubbs.

The separation of the presidency and directorship was brought about in the year 1912 when Gordon H. True, professor of animal husbandry, was made director of the Station. In 1913 S. B. Doten succeeded Director True and has acted as director up to the present time.

A recent interesting development at the Nevada Station is the study of the economics of reclamation of the desert by irrigation. This is a study of markets, crops, and the cost of production of products which may be shipped to outside markets.

A great interest to prospective as well as present farmers of this irrigated land is the Nevada cooperative snow surveys which now have been 10 years under state direction and support, during which time maturity and service have been attained.

Twenty years ago the Mt. Rose Observatory was conceived. A few years later the study of the effect of forests on the conservation of snow led to the forecasting of stream flow, now recognized as the foundation of crop planting in the irrigated west.

The early years of slowly forming ideas were under the tutelage of the Nevada Academy of Sciences and the Nevada Agricultural Experiment Station which had just acquired the Adams Fund for research.

Basins Organized

THROUGH the cooperation of Nevada, California, City of Los Angeles, Utah Agricultural Experi-

ment Station and various power companies, and irrigation districts, the snow survey has gradually been extended over the Sierra Nevada, and the Great Basin. On the eastern slope of the Sierra Nevada, the Tahoe Truckee, Carson, Walker, Mono, and Owens Basins have now been fully organized, except for small details connected with refinement of method.

On the western slope, the South Yuba is as yet the only basin fully organized. However, the Mokelumne Basin only awaits the improvement of reservoir sites downstream to supplement its crest stations by stations at low levels, while some form of snow surveying has now begun on the Middle Yuba and the Klamath.

In the Great Basin, plans are still in the formative stage. A partial snow survey system has long been in use in the Humbolt Basin, but owing to lack of funds for adequate observations, the results have been very unsatisfactory, particularly because of the low elevation of much of the watershed.

A complete system of snow surveying has been prepared for the Colorado Basin, the development of whose resources is now awaiting early realization. A similar system has also been devised for the entire Columbia River Basin, whose development lies in the more distant future.

The Nevada System

IN addition to the close cooperation in Nevada, California, and Utah, the Nevada System has been adopted by the Washington Water Power Company (Spokane), the Shawinigan Power Company (Montreal, Canada), and in part by the Black River Control District (Watertown, New York). Apparatus for surveying has been purchased by the Canadian Meteorological Service for use in the Bow Basin, the U. S. Reclamation Service at American Falls (Idaho) for the Upper Snake Basin, and by the Stavanger Power Company in Norway and the Zurich Glacier Commission for glacier study in the Alps.

The basic principle of snow surveying is the determining of the relative water content of the snow cover at the beginning of the spring run-off. This can be done with certainty only by ascertaining the water content of the snow rather than its depth or the seasonal precipitation measured storm by storm.

The snow sampler, which records the water content of the snow directly on a dial by weighing, can be driven to a depth of 20 feet or more, and has penetrated the deepest snow yet found in the snow study of the Sierra. A specially adapted toothed cutter makes it possible to cut through thin crusts of ice and penetrate the upper layers of congealed snow on glaciers.

Since the snow falls more or less uniformly over wide areas, it is necessary only to maintain a few snow courses in each basin or group of closely situated basins. These courses consist of 20 to 40 measurements usually 50 feet apart, maintained un-

Driving the sampler in deep snow at Ward creek (elevation 7,000 feet) at the eastern crest of the Sierra Nevadas.

changed in the same place from year to year. The average water content of several annual measurements is made the mean from which to estimate the seasonal percentage for the current year.

Zones Laid Out

TO check variation in precipitation with altitude or distance from the crest of the range, crest as well as outpost stations are maintained. Because of loss of snow through premature melting on the lower edges of the basin, the basins have more recently been laid out in zones based on elevation, and the percentage of snow cover for each zone is weighed according to relative area of the zone.

For purposes of forecasting, the seasonal percentage of the snow cover in the basin April 1 is considered as representing the seasonal percentage of the succeeding run-off during April-July, at the end of which period the snow cover practically disappears as a dominant factor in the run-off and summer precipitation takes its place.

The accuracy of the snow survey is based on two fundamental facts: (1) As already stated, the approximate uniformity of the snow cover over wide areas, and (2) the intimate relationship in the Sierra Nevada between winter snowfall and spring-summer flow. The only two disturbing factors of major importance are: (1) the premature melting of the snow cover at lower levels, and (2) deficiency in normal precipitation during April-July. The former can be determined and measured by means of low level courses at the time of the annual snow survey March 1 or April 1. The probability of the latter and its results can usually be determined by May 1 or at latest by May 15.

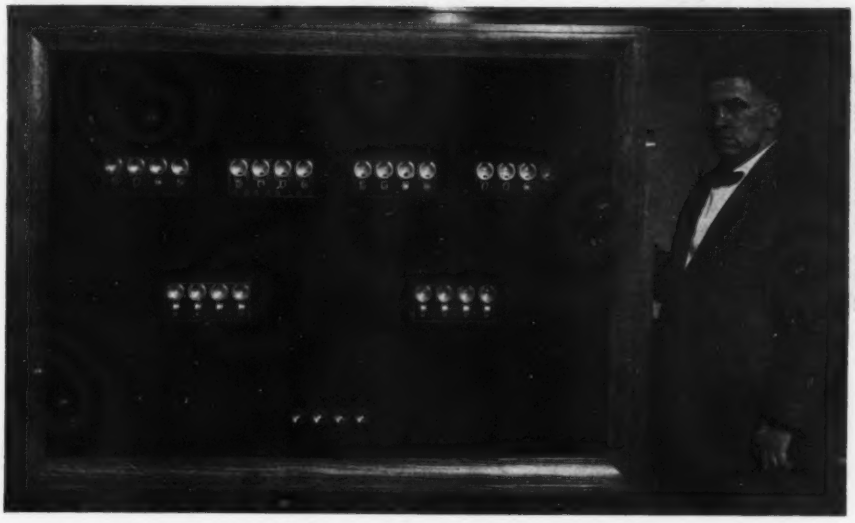
Six Basins

SIX basins, those longest organized, are included in the test series and are situated on both sides of the range. One of these, Lake Tahoe, is greatly affected by precipitation upon its surface. Another, the

(*Turn to Page* 47)

Refuge hut and snow survey headquarters at Contact Pass (elevation 9,000 feet). This cabin, made of sandbags, has since been replaced by a better hut of sheet metal.

Herediscope *is* Invented *to* Teach Mendelian Theory *of* Inheritance



R. R. Graves, in charge of dairy cattle breeding investigations, Bureau of Dairy Industry, U. S. Department of Agriculture, with the "herediscope" which he has invented to illustrate the manner in which hereditary characters are transmitted from parent to offspring.

"HEREDISCOPE" is the name given to a device invented by R. R. Graves of the Bureau of Dairy Industry, U. S. Department of Agriculture, to demonstrate the Mendelian theory of inheritance. He built the contrivance to assist in teaching the principles of inheritance in dairy cattle and hopes that it will be useful to county agents, lecturers, and others engaged in spreading knowledge of better breeding methods.

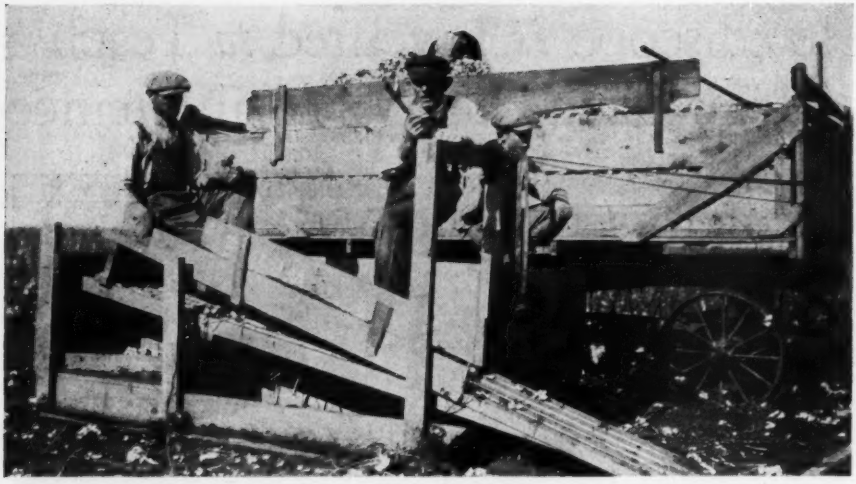
The machine is made up of a number of groups of aluminum cups, each group representing an individual animal. These groups of cups are arranged in the form of a pedigree representing three generations, although machines including more generations could, of course, be constructed. Many small colored balls, each representing any given hereditary character, are placed at random in the cups of the starting generation which in the machine illustrated in the picture would be the grandparents.

Colors Represent Factors

ONE of the colors might represent the factor for high production of butterfat, or it might represent coat color, or any other factor. It might be the factor for low production of butterfat just as well as the factor for high production of butterfat. The marbles representing the various characters are put in the cups in the first generation, and when a trigger is pulled, half of the character symbols from each parent cup are sent on to the cups representing the next generation, the selection of the characters in the change from one group of cups to the other being merely chance as in the case of actual matings.

By repeating this process several

(*Turn to Page* 54)



This is a detail view of a side-draft sled showing how it operates.

Picking COTTON

¶ A simple sled may be the first hint of a revolution in the production of cotton

SNAPPING cotton by a mechanical means known as "sledding" was widely practised in southwest Oklahoma and the Texas Panhandle last year, in spite of the objections which were advanced. Economic conditions caused the resort to mechanical means of harvesting in an effort to reduce costs and make up for labor shortage. It was another case where necessity was the mother of invention.

Much of the cotton in the Southwest has been hand snapped for a number of years. At first the practice was severely condemned and objections are still raised to it.

However, unfavorable weather last year, a labor supply both expensive and hard to get, together with a low price for their crop, led farmers to try the still more severely criticized method of sledding.

Although machine labor has replaced man labor in a number of farm operations, the method of gathering cotton, with exceptions here mentioned, is not materially different from what it was in colonial days. Getting cotton out of the fields is very expensive in man labor and is the limiting factor in the acreage of cotton which one man can handle.

Sleds Are Simple

THE sleds which were used to gather the cotton were very simple in construction. They consisted of a box on runners for holding the cotton as it was snapped. Many farmers used old wagon boxes for this

The cotton is collected in a box at the side of the platform where it is easily handled.

by Horse Power

By W. W. Fetrow

Department of Agricultural Economics, Oklahoma A. & M. College

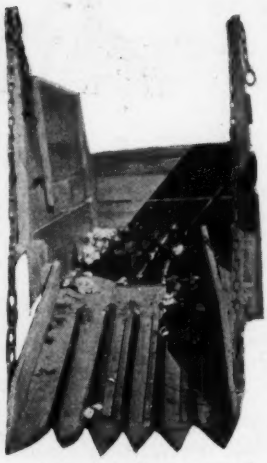
purpose. In front of this box there were either one, three, or five grooves made usually out of two by fours, pointed at the end and set at an angle. These grooves were about three-fourths of an inch wide and from two to six feet long, depending on the type of sled. The cotton bolls were caught in these grooves, pulled from the stalk, and raked into the box as the sled passed down the row.

There were many different kinds of sleds due to the fact that most of them were made by the farmers, but they all operated on the same principle. Most of the sleds were pulled by two horses, the team straddling the row of cotton to be snapped. However, in some sections they used what they called a "side draft" sled which gathered the cotton from the row at the side of the team. These sleds were easily operated by a man to care for the cotton as it passed through the grooves and a boy to drive the team.

Three Methods

THERE were three methods of gathering cotton used in the Southwest last year, viz., picking, hand snapping, and sledding. It should probably be stated here that these farmers prefer to pick their cotton when they can. Talk to these farmers as you come to them and most of them will say they would rather pick their cotton than snap it. But labor was scarce in this section last year, as it has been during the past four years. Most of the laborers refused to pick cotton but were will-

ing to snap it. Rains delayed picking for those who had the laborers and made the cotton so hard to pick that most farmers had no choice but to snap it or leave it in the field. While they were delayed in gathering the crop the price of cotton was declining. The price was soon so low as compared to the cost of hand snapping that this method was not profitable. The sled was the only means by which the farmer could gather his cotton and have anything left when it was sold.



Most sleds have several grooves.

A sled could be bought or made on the farm for about $20. The amount saved on one bale would almost pay for the sled.

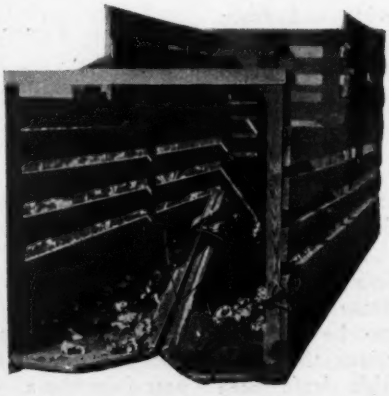
A few figures will help to explain the situation of the farmer in the Southwest last year. If a farmer owned his land and picked his cotton, he would have left about $25 or $30 out of each bale after paying for his picking and ginning. If this farmer was renting his land and giving one-fourth of the crop as rent, he would have left about $12 or $16 out of each bale. If the farmer was renting on halves and picked his cotton, he would do well to break even on picking and ginning to say nothing of his labor and expenses in growing the crop.

Objections

THERE are two principal objections to the sleds. One of these is the fact that much cotton often is left in the field. The amount of cotton left in the field varies a great deal, depending upon conditions. In some cases very little is left in the field, and in others from 25 to 30 per cent. This depends mostly on the type of seed used and the size of the cotton stalk.

The other objection to the sled is the amount of leaves and stems gathered with the cotton. The amount of trash gathered also will vary a great deal. It is often impossible, however, to distinguish sledded cotton from hand snapped cotton. In fact the best sledded cotton is far superior to the poorest hand snapped cotton. In handling the sledded cotton, as many of the stems and sticks as possible are picked out.

The principal advantages of the sled are that it provides a faster method of gathering cotton, takes less labor and costs less, no cotton is picked from the ground, and the sled can be used when the ground is too wet for hand snapping. For the sled to work best, the cotton should be small or of medium size, have few branches, and be free from leaves and weeds.



This is a type of single groove sled.

No one knows what the future development of mechanical cotton pickers will be. Probably the greatest improvements will come in gin machinery for cleaning the cotton. If cotton can be gathered by machines and cleaned with no loss to the grade or staple, cotton production will be revolutionized.

¶ Weeds once refused to grow on the abandoned land reclaimed by a county agent in this story on

Good Farms *from* Blow Sands

By R. H. Stinchfield

TO find a man living in all contentment where three years ago he declared that he would not live if the place were given to him, is a situation that arouses interest. But to find that man thoroughly enthusiastic about his place, precludes any idea that circumstances force him to make the best of the situation and arouses wonder.

And it is with wonder that one visits Harley Jacklin on his 40-acre farm in Portage county, Wisconsin, and learns that three years ago the fields, which now rank in crop production with any in the Badger State, were nothing but stretches of blow sand which scarcely grew weeds.

Harley Jacklin is a young farmer

Blow sand before and after a treatment of lime, commercial fertilizer analyzing 2-16-28, and alfalfa. (And County Agent Noble is a tall man.)

with a rosy faith in better times for agriculture. Even so when he first drove past this abandoned farm, he told County Agent H. R. Noble that he wouldn't live on that place if it were given to him. But he hadn't counted on a vision in Noble's mind —a vision of bringing back into a prosperous and healthy community that whole section which had been mined of its fertility and abandoned by farmers during the great depression after the war.

How He Did It

JUST how Noble did it is a piece of work which has attracted not only attention throughout Wisconsin, but in neighboring states where similar

worn-out soils problems exist. A hustler in every sense of the word, Noble had already demonstrated that excellent and profitable crops could be grown on the marsh lands of the county by supplying the elements of plant food—chiefly potash—which were lacking in the well drained peat. And now he was worrying about all that abandoned blow sand.

The solution to the problem is an interesting tale of a business man's faith in a county agent and the agriculture of his community. H. D. Boston is a furniture dealer and undertaker located in Stevens Point, a city surrounded by the sand country. About 10 years ago Boston acquired two of the abandoned farms south of the city and became a soybean booster. However, the growing of this crop without applying lime or fertilizer and removing the crop from the field were not good practices from the standpoint of building up the soil. They were rather soil-robbing practices, and later when the price of soybean seed dropped, Boston discontinued the growing of this crop.

Four years ago, supported by County Agent Noble's advice, Boston turned to lime, potash, and alfalfa as the chief factors needed for rebuilding the sick land. He put in his first small piece of alfalfa on what is now the Jacklin farm. Jim Isherwood, an outstanding farmer of the community, did the work for him.

The results were astonishing and led to interesting Boston in planting more and more alfalfa. He hired all of the work done by near-by farmers who were glad to find extra work to boost along the income from their own places.

The adventure proved a profitable one. Alfalfa thrived, and it wasn't long before Boston was ready to dispose of some of these farms carpeted with seedings of this rich legume which would satisfy the envy of any dairy farmer.

It is one of Boston's farms that Jacklin bought. The son of a pure-bred Guernsey breeder in an adjoining county, the young man saw in the alfalfa the possibility of maintaining a good herd of cows. Furthermore, he could purchase this land at a very reasonable figure.

A Show Place

FORTY acres is all that he bought, but that forty after three years is a show place of the community. One 4-acre field of sweet

(*Turn to page 58*)

Signs like this were erected to stimulate interest.

The international group of soil scientists who made the tour.

The

¶ Delegates to the First International Congress study chief crop regions of North America

Soil Science Tour

By G. J. Callister

Co-Director, Agricultural and Scientific Bureau, N. V. Potash Export My.

MANY years ago, Mr. Pullman evolved sleeping cars. He probably little expected that one day more than 240 people, representing 30 nationalities and 25 languages, would be crowded into some dozen of his cars for 30 days and 30 nights to travel amiably for 10,000 miles. Yet this was done and not only done, but accomplished with marked success.

The occasion was a tour by soil scientists from all over the world. It was a complimentary transcontinental tour of the United States and Canada to the foreign delegates of the First International Congress of Soil Science, which was held in Washington. The trip was conducted under the auspices of the American Organizing Committee, formed of soil scientists from different parts of the United States. Dr. A. G. McCall was the executive secretary of the committee, Dr. O. Schreiner the chairman and official tour guide, and Dr. C. F. Marbut a member of the committee and official tour guide. The tour started on Wednesday, June 22, from Washington, D. C., and ended at the same city on July 22. The map on page 28 shows the route taken. As explained by Dr. McCall, the purpose of the tour was to give the foreign delegates to the Soil Congress an opportunity to study the great soil regions of America, the crop zones, and some of the principal agricultural industries.

For the outstanding success of the tour a generous vote of thanks must be accorded particularly to Dr. J. G. Lipman, who was the first president of the Society of Soil Science, to the Organizing Committee, and also to many other groups and individual people, as well as many travel agencies and agri-

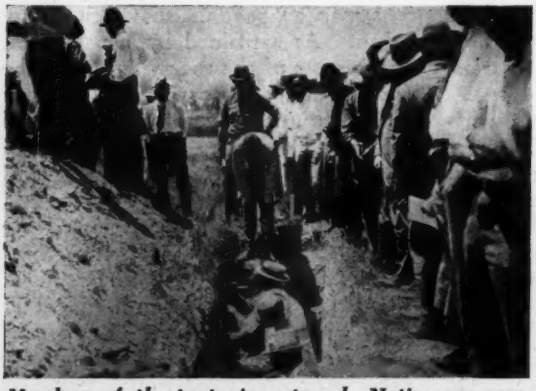
"Now of the wise man's words I learn the sense;
How all things live."—Goethe

cultural industries who so kindly entertained the members of the party.

No Room for Dignity

THAT Pullman cars are designed, making it possible for some 240 people to live and travel for 30 days in one train, is an economy not to be overlooked. The fewer the cars, the cheaper the cost, which is a consideration to scientific people, even in these days of urban prosperity. And then, too, the Pullman design—30 men in a car for 30 days—compels a respectful degree of intimacy that no mere barrier of 25 languages could break down.

There was room for everything; for bags of soil more precious than gold; for a bewildering variety of botanical specimens; for mountains of baggage; for maps, photographs, books, guides, the typewriter, daily paper, and a carload of cameras; but there was no room for an excess of dignity. That was one thing that had to be thrown overboard about the second day. It was largely a khaki shirt and coatless party. Mr. Pullman looked far ahead when he designed his cars. He compelled people to know each other, which was good for the people.



Members of the party in a trench. Notice one man with a bottle of acid testing for carbonates.

Ladies Were Grateful

IN addition to the standard sleeping-cars, the train was thoroughly equipped with compartment and observation cars, two dining-cars and a baggage car, as well as sight-seeing cars as the occasion demanded. The ladies (for about 20 ladies accompanied the tour) were grateful for the compartment and observation cars, and the

One of the profiles studied in the arid section of the Southwest.

gentlemen, in turn, were grateful for the charming presence of the ladies.

Unfortunately, owing to other duties which took him abroad, Dr. J. G. Lipman was unable to accompany the tour. Every one wished he were there. The leaders of the tour were Doctors Marbut, Schreiner, and McCall, and a vast amount of appreciation should be accorded to these gentlemen who so patiently explained a multitude of things that need explaining when people from all over the world come together. Many members of the staffs of the state experiment stations were also present throughout the tour, which was a great help to the foreign delegates. Associated with the leaders as their right-hand man in arranging their daily routine was the genial and capable E. N. Thorn, Assistant General Passenger Agent of the Baltimore and Ohio Railroad—a diplomat of the railway service—who was in charge of transportation arrangements throughout the journey. Much of the success of the trip was due to Mr. Thorn and the personnel of the 12 railroads over which the tour passed.

Another vote of appreciation must be given the delegates themselves for their excellent good humor, their sportsmanship, their ability to adapt themselves to new methods and modes of life; to engineers that start and stop decisively; to the American summer heat; to the American water supply; to overalls, whether khaki or blue; to baths in quick rotation or en masse, as the occasion or Mr. Thorn demanded; to country stores that

In the Piedmont section of the South; one of the first profiles examined on the tour.

American farm machinery was a source of great interest to many visitors. Its use was studied throughout the tour; the manufacture particularly at Moline and Chicago, Ill. The picture shows the party inspecting a combine typical of western agriculture.

kept everything but the right foreign photographic film; and to automobile drivers that could drive up mountain peaks with one hand and explain the scenery with the other—a feat which never failed to thrill the passengers peering into the dizzy depths below.

Doctor Curtis F. Marbut,

Chief of the Soil Survey Division, Bureau of Soils, United States Department of Agriculture; one of the Official guides of the tour and author of the book which described the soils over which the tour passed.

Whole-hearted Hospitality

LAST, but certainly not least, must appreciation be extended to the many groups of public-spirited citizens in our state agricultural colleges and experiment stations and in our towns and cities who entertained the members of the excursion—one wide circle of cordial welcome and whole-hearted hospitality. As the paper printed on the train very properly said:

> "The excursion would not have been a success without the help of the local committees. We, therefore, take great pleasure in expressing our most sincere appreciation to the people at Greensboro, Knoxville, Athens, Atlanta, Memphis, Carthage, Aurora, Sheldon, Kansas City, Hays, Rocky Ford, Canon City, Salt Lake City, Riverside, Los Angeles, Trona, Fresno, Corvallis, Portland, Vancouver, Edmonton, Saskatoon, Berkeley, Indian Head, Winnipeg, Fargo, St. Paul, Minneapolis, Ames, Des Moines, Moline, Chicago, and Lafayette."

Many were the good friends in all these places that fed, bathed, and entertained the party, all in a spirit of the truest and most cordial hospitality, which was appreciated to its fullest extent by all the travelers.

While the primary purpose of the tour was to study the soil regions of the United States, this original purpose was far outshone by a much greater achievement, namely, a closer affinity of understanding and mutual regard between the representatives of the different countries of the world.

Throughout the long trail of 10,000 miles, a spirit of understanding that will never be forgotten developed. The tour was an object lesson of the fact, so sorely needed, that a mutuality of purpose can bring a mutuality of understanding. It was the chief theme of many addresses given by delegates while on the tour, and a topic of discussion in the paper published on the train.

International Good Will

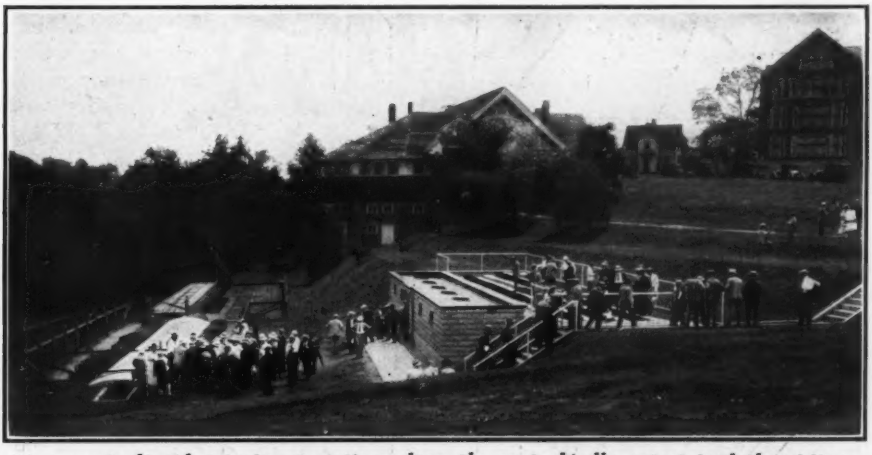
TYPICAL of many such addresses were those following the banquet given at the Mission Inn, Riverside, California, on July 5. Among the speakers were Professor F. Schucht of Germany, Professor A. A. J. De'Sigmond of Hungary, Professor K. D. Glinka of Russia, Professor T. Imaseki of Japan, Sir E. John Russell of England, and others. The theme of all their addresses was international good will—the value and accomplishment of a better understanding by having lived, worked, and played together.

The comments of Professor F. Schucht—in German—were particularly happy in contributing to this achievement of the tour—a mutual understanding. Professor A. A. J. De'Sigmond on the same occasion used the soil profile as a happy simile, remarking that a study of the surface was not sufficient.

Professor Doctor K. D. Glinka, Leningrad, Russia,

who was elected President of the International Society of Soil Science at the close of the First International Congress of Soil Science at Washington.

As Sir E. John Russell, Director of Rothamsted Experiment Station, pointed out, to avoid international clashes the great problem at present is to bring the spiritual values into our civilization—the material alone is not sufficient. If we can continue to develop friendship between



Many agricultural experiment stations along the route kindly entertained the visitors. Among such stations were: Knoxville, Athens, Hays, Tribune, Riverside, Corvallis, Vancouver, Edmonton, Saskatoon, Indian Head, Brandon, Winnipeg, Fargo, St. Paul, Ames, and Lafayette. This typical photograph was taken while studying the lysimeters at the University of Tennessee, Knoxville, Tenn.

The group of ladies who accompanied the party on the tour.

the people of different nations, then these spiritual values will grow. The tour had accomplished that to a significant degree.

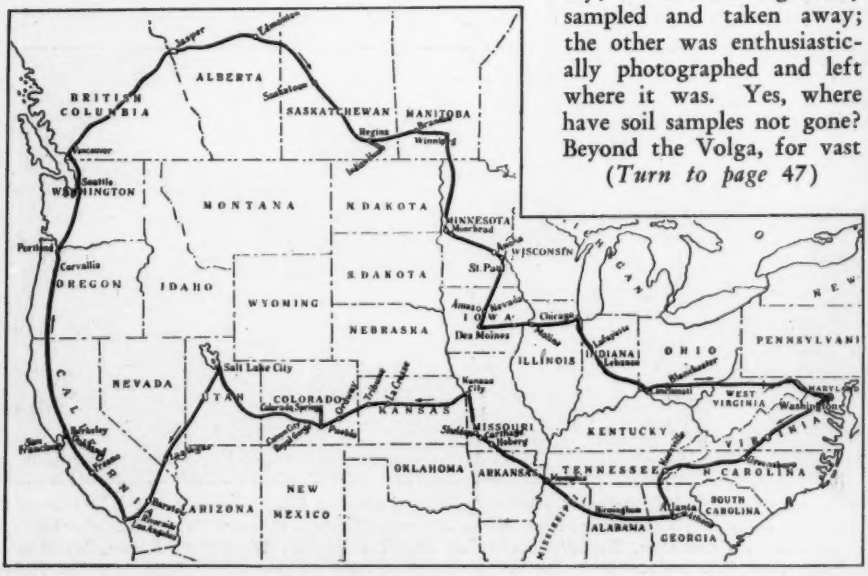
Similar thoughts were expressed in various ways in their own words and in their own languages by the other speakers. We were also particularly glad to hear from Frank Miller of Riverside, California, a well-known worker in the cause of better international relations. Again quoting from the paper—published on the train—issue No. 27:

"Representatives of more than 30 nations have proved to the world what differences can be settled by mutual understanding. Without knowing one another's language we can come together on a common basis and discuss the problems of common interest. Science and art are the universal languages which are finally bound to unite us all as one people —the people of the world."

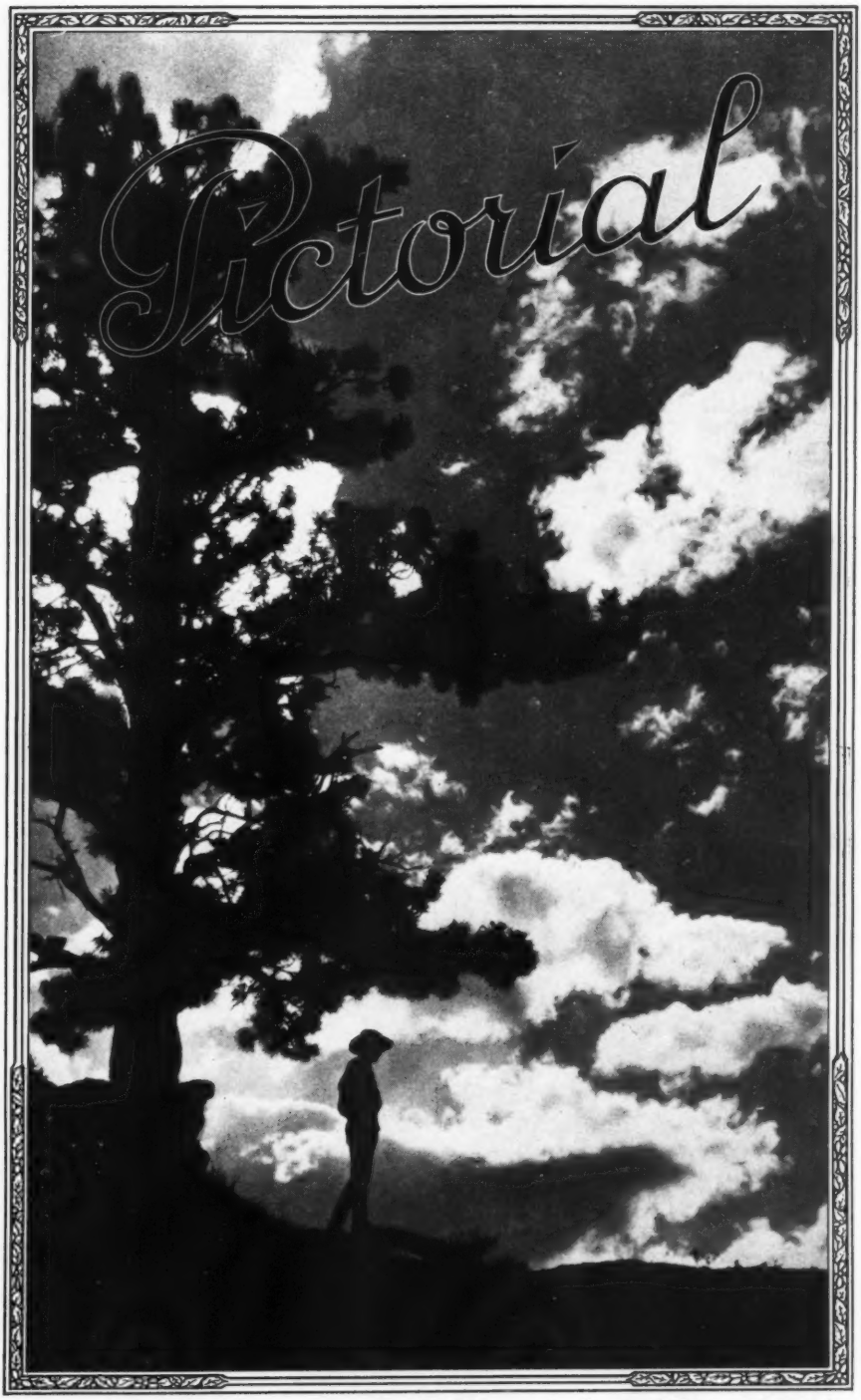
Soils and Scenery

SPECIFICALLY the members of the excursion were chiefly concerned in two things: soils and scenery; the one was vigorously sampled and taken away; the other was enthusiastically photographed and left where it was. Yes, where have soil samples not gone? Beyond the Volga, for vast

(*Turn to page* 47)

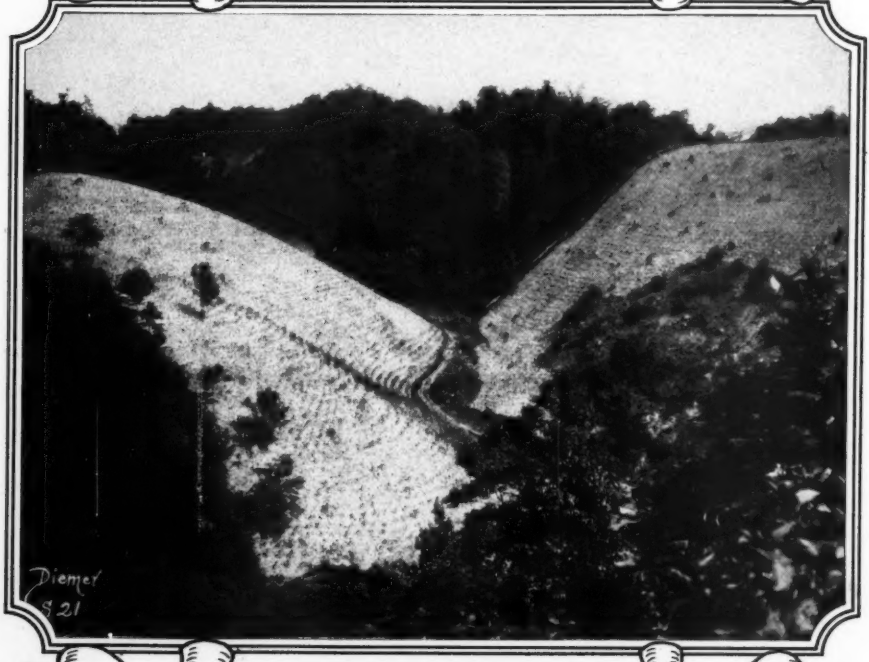


The route of the tour from Washington to Los Angeles, returning through Canada.



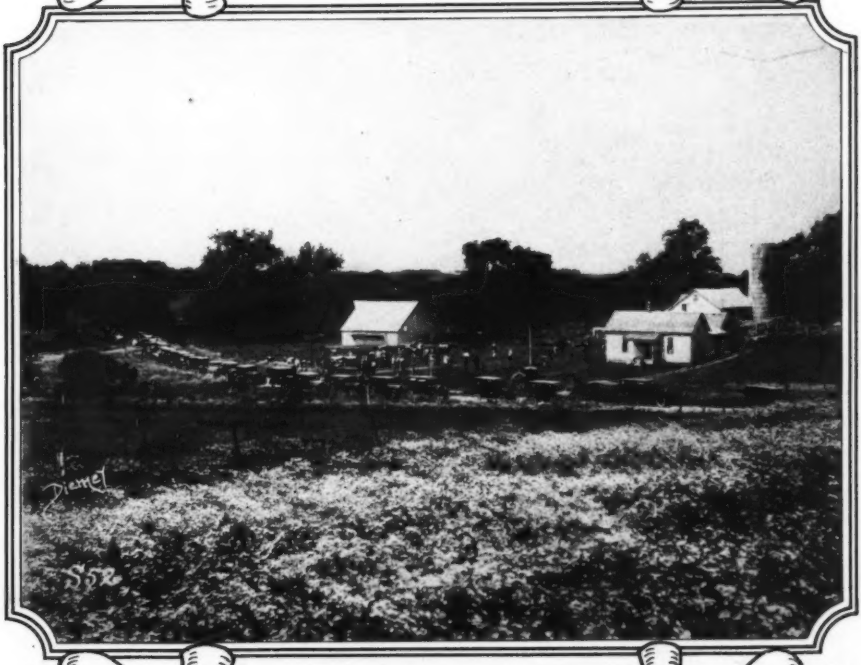
A Pictorial Resume of the Tour of the Soil Scientists

NORTH CAROLINA

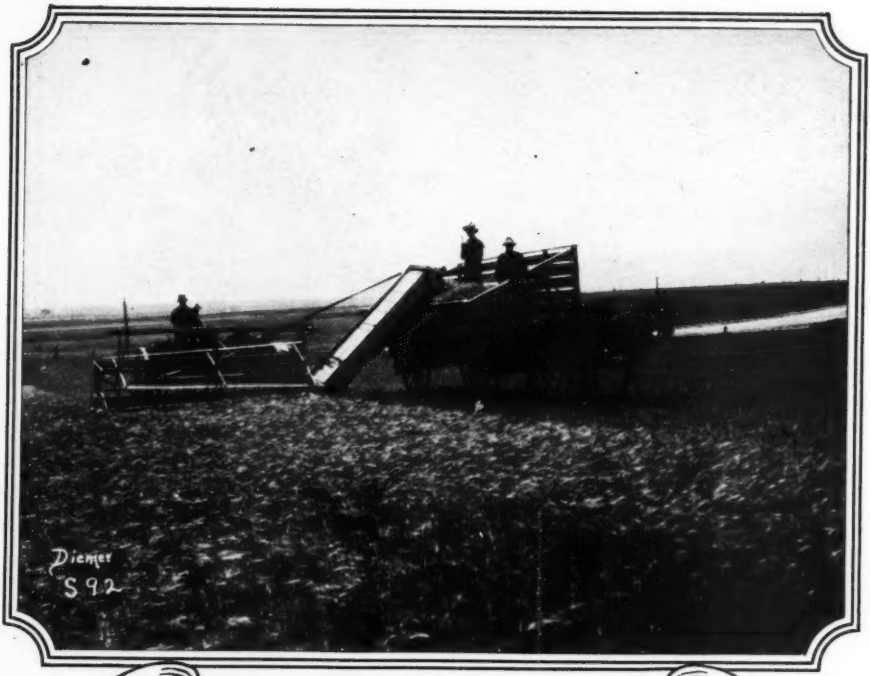


TENNESSEE

GEORGIA



MISSOURI

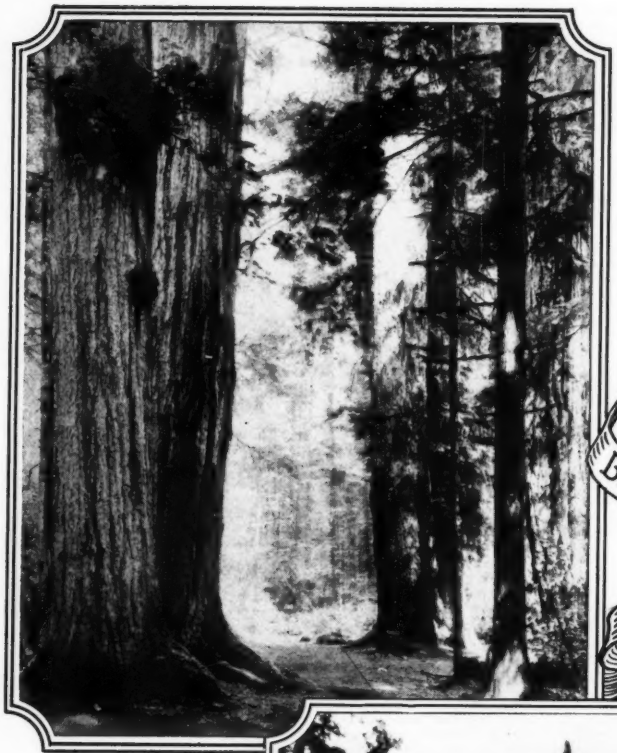


KANSAS

COLORADO

NEVADA

CALIFORNIA

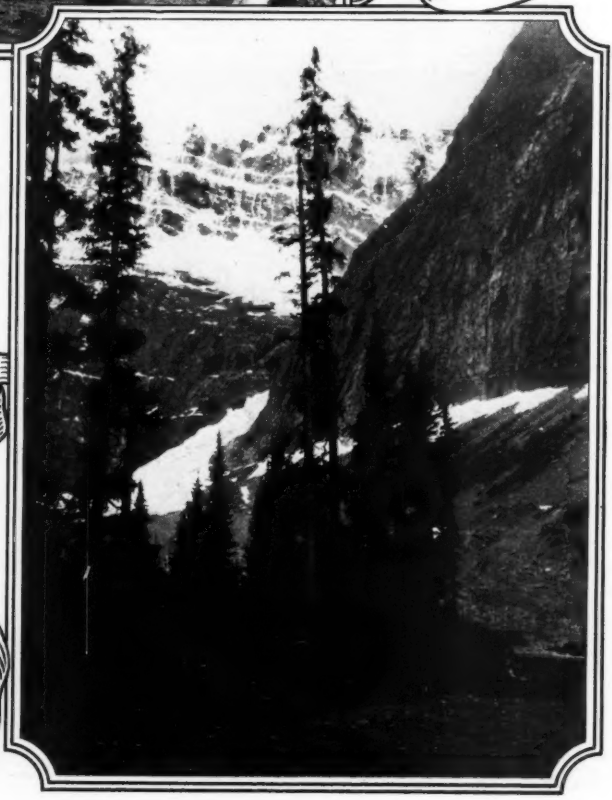


This series of photographs shows some outstanding contrasts between different regions of crop production, scenery, and typography visited on the tour. All the views are, of course, typical of regions covering several states and provinces. *(See pages 50-51).*

BRITISH COLUMBIA

In books are many photographs and vivid descriptions; but only by actual visits can the "detail, the color, the tone, the air, the life" of our greatest national resource; the land, be truly appreciated.

ALBERTA



SASKATCHEWAN

NORTH DAKOTA

IOWA

INDIANA

The Editors Talk

Diversified Fertilizing

The total fertilizer tonnage sold in the United States each year since the war has fluctuated widely. During the 12 years, 1914-1925, the total fertilizer tonnage did not increase over the pre-war period, 1900-1914, and the fluctuations were much larger than in the previous period. There were, for instance, decreases of 1,800,000 tons in 1915 and 2,400,000 tons in 1921.

These fluctuations are caused chiefly by changes in values per acre of farm crops, that is, changes in crop prices and average yields. Therefore, *increases or decreases in crop values cause changes in the fertilizer sold.* At the present time, the values per acre of cotton and tobacco make up more than 60 per cent of the factors affecting variation in the total tonnage of fertilizers sold in the United States.

While no doubt there must always be some fluctuation, if a greater degree of stabilization is ever to be accomplished, this dependence on cotton and tobacco values must be reduced and fertilizers used in large amounts on many other crops. There is an urgent need for a more careful follow-up of the fertilizer requirements of corn, grain crops, legumes, and small specialized crops. In fact, no crop should be considered unimportant from the fertilizer viewpoint. The tendency at present is to pay too much attention to a few high cash crops, and not enough possibilities are seen in the lower value general crops.

Crop diversification is a good thing for the farmer. Diversification in the fertilizer sold is also a good thing for the industry, as well as the farmer.

Nature fits all her children with something to do.
—A Fable for Critics.

Survival of the Fittest

Last year more than half a million people left farms to seek more remunerative employment in the city. This fall, with another harvest tallying up successes and failures, a similar trek will start.

Alarmists already are voicing their predictions—downtrodden agriculture, famine, high cost of living. These men seem to have forgotten completely one of nature's inexorable laws—*The Survival of the Fittest.*

We have no sympathy whatever with the alarmists. Rather do we wish to endorse the opinions of two men who see in the exodus from the farms a brighter future for agriculture.

One of these men, Secretary of Agriculture Jardine, speaks from a vision of the nation's agriculture such as few men in the United States are privileged to acquire. In citing the fact that the number of people actually living on farms fell from 32,000,000 in 1910 to less than 28,000,000 in 1927, he points

out that a certain part of this movement is due to the natural long-time adjustment which will always go on between industrial and agricultural activities and methods of earning a livelihood.

He believes that it is a healthy movement and need not operate to the disadvantage of agriculture.

The other man is a farmer, C. J. Hayward of Colorado. In a letter to the editor of *Farm Life,* Hayward says:

> "What would we farmers do now if 71 per cent of our population (as in 1880) were rural? We farmers progress as do other manufacturers. By the use of machinery one man can now do what 10 men used to do. Every year more and more labor-saving machinery is coming into use. Every piece of machinery put in use on the farm has released men from the farm and put men to work in the city, making more machinery. What would be more natural than for men to move from the farms to the city? . . . .
>
> "The rural population will continue to move to the city until the balance is such that the employed men of the city will make the demand for farm products equal or exceeding what the rural population can produce with the use of labor-saving machinery. Until that time the farmer's lot (as a whole) will not be all rose blossoms. Helping the man in the city to find profitable employment so he can buy more is better horse-sense than to worry about keeping him on the farm.
>
> "Some government legislation may help the farmers a little, but the main help will have to come from within. Wheat is now worth $1.25, local elevator. If I can produce it for $1.20, I can get ahead. If it costs $1.30 for me to produce it, sooner or later I will have to move to the city, and still there is only 10c. difference bewteen $1.20 and $1.30. Right there is where some of us farmers lose out. It isn't the big things, but the little leaks that make the difference between $1.20 and $1.30 cost. I believe the government can help us by not developing more land. Let the demand catch up with the supply. Do not encourage settlers on new dry lands until the price of farm commodities has risen so the new settlers can make a profit and succeed."

The other side of the picture, as Secretary Jardine stresses, is the need of keeping competent farmers on the farms, men and women who know rural life, who love it, and who can contribute substantially to its development. The development of a rural community life on a plane comparable to surroundings in the towns and cities will accomplish much toward that end, he believes.

But we maintain that the sound conditions of a happy and healthy rural community are closely tied up with sound economic conditions.

The best investment is in the tools of one's own trade.
—BENJAMIN FRANKLIN.

Tar Heel Resourcefulness

The people who appreciate water the most are those who live in deserts.

The farmers that appreciate fertilizers the most are those that live on poor soils.

Thus, curious as it may seem, agricultural communities in the poorer soil regions are often the most prosperous for the simple reason that they use all the resources available to build up the soil, while the people on the better soils are more inclined to merely accept what nature gave them and let it go at that.

As an instance, North Carolina is one of the most productive agricultural states in the Union, yet the state as a whole possesses soils of only moderate to poor fertility. No state in the Union uses as much fertilizer as North Carolina,

The state is thus poor in soil, but rich in the resourcefulness of its people in making the most of what science and the business man have made available for a more prosperous agriculture.

The following from the *Drovers Telegram* on FERTILIZER PROFITS tells the story better than we can:

> "NORTH CAROLINA was cursed or blessed, it is difficult to determine which, with naturally poor soil—nearly as poor as the soils of Georgia, Alabama and South Carolina, and decidedly more so than any of the states to the west and north of those named. Yet North Carolina has become one of the most productive agricultural states of the union. The Tar Heel people have literally become rich by buying plant food and speculating on it.
>
> "That is, the North Carolina people have bought vast quantities of commercial fertilizers, applied them to cotton, tobacco, truck crops, peanuts, and corn, and grown rich on the profits after paying for the fertilizer. No other state has used nearly so much fertilizer to the acre, and only two or three irrigated states have made as much cotton to the acre as has the Tar Heel State. No other southern state makes as much tobacco of as high quality. That section is not regarded as very productive of corn, but North Carolina makes a better average yield than any other cotton state except Texas, and ties with that state."

The farming population on many other soil areas could profit by this lesson of North Carolina.

Business ideals are the sign-posts of business conduct.
—FARM MARKET SAYINGS.

Business Ethics

That business as a profession with definite ethical standards is growing is shown by the fact that at least five books on business ethics were published last year. It is significant that each writer is impressed with the "growing ethical importance of the trade association movement as a force in the direction of higher ethical standards."

Dr. Edgar L. Heermance, in his book THE ETHICS OF BUSINESS, particularly discusses the trade association for his group unit for three important reasons: trade associations are made up of a considerable number of units, which means a diversity of opinion; they are of recent growth so that the process of developing group consciousness lies within the memory of men still actively engaged in business; and trade associations usually make early efforts to define their activities in the form of codes.

These books have been ably reviewed by W. B. Donham, in the HARVARD BUSINESS REVIEW. As he properly points out, trade codes too often have little relation to hard reality and, therefore, unhappily point in one direction while the practical affairs of business head very definitely in another. To reconcile trade practices and codes is one of the chief problems of modern business.

The difficulty, in the opinion of W. B. Donham, is the lack of recorded cases. He concludes that much research work must be done before a satisfactory study of practices can be made and standards evolved in the way that legal principles have evolved, that is, as generalized from specific cases. In other words, what is needed is "hard-boiled concreteness as a basis." At the

present time, we are too much in the position of hopefully sitting on ethical committees forming codes without the fundamental aid of carefully recorded specific situations.

The evolution of ethical principles and their acceptance by modern business are excellent in theory. Doubtless we all accept them—at least for the other fellow. But we believe that there is a lot of hard practical sense in what Mr. Donham says. Before trade associations and ethical codes will effectively help to stabilize business, many specific cases of where the code and practice do not fit will have to be studied patiently.

This requires confidence in the association on the part of all its members—that their mutual good is best served by an association—that a code is essential. It also requires time and patience and diligence by some one in every association who is willing to work eternally hard and be satisfied with but small thanks from his own generation.

But some one will do the job. The profession of modern business demands it.

Louis A. Fuertes

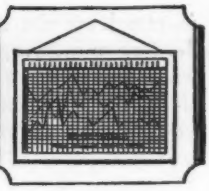
With profound regret we record the death of Louis Agassiz Fuertes, artist, naturalist, and lecturer of ornithology at Cornell University. By the untimely close of this life, the world of science and art suffers and irreparable loss.

Louis A. Fuertes' work won for him great distinction, not only in this country, but abroad. Perhaps the work by which he will be best remembered is a series on habitat bird groups in the American Museum of Natural History, New York City. His untimely death will leave his book on the Abyssinian expedition of the Field Museum of Natural History only half completed.

As Alexander Pope said, "All Nature is but Art unknown to thee." We have seen, in the unique personality of Louis A. Fuertes nature revealed in art by the rare combination of scientist, naturalist, and artist. He brought together Nature and Art, scientist and layman in one common love and devoion to that field in which he was so ardent and so inspirational a worker.

Bacon, speaking of the forces of Life, says: "Fame is of that force as here is scarcely any great action wherein it has not a great part." May we not trust that by the untimely death of Louis A. Fuertes his work may not cease, but in his Fame be carried on in memorial by those who shared his labors and those who received the rich benefits of his devotion to the world of Nature and Art.

AGRICULTURAL DEVELOPMENTS



By P. M. FARMER

Potash Holds Leaves on Cotton Plants

Cotton on experimental fields on which potash had not been used shed practically all leaves by the first of August, according to a statement by E. B. Ferris of the Mississippi Agricultural Experiment Station. Other fields, similarly fertilized but with potash added, retained the leaves until frost and produced a better yield of better grade cotton that was more easily picked. In the cotton work at that station it was also found that proper fertilization aided greatly in the battle against weeds. The fertilized cotton started off quickly and soon shaded the ground and drove out the foreign plants. On the unfertilized fields the weeds and grass remained strong competitors throughout most of the season. It is apparent that fertilizer should be given credit for reduced labor in caring for the crop.

Soft Corn Coming

It looks as if there will be a lot of soft corn again this fall, and states in the corn belt are warning the farmers to make preparations to handle it in such manner as to reduce losses to a minimum. The University of Illinois says that soft corn cannot be husked safely as early as mature corn. The ears will dry faster on the stalks than in the crib. Also, late in the season when the weather is cool, there is not so much danger of spoilage in the crib. Soft corn should be husked clean as husks, silks, and shelled corn fill up the space around the ears and interfere with the circulation of air. Throwing out the sappy, rotted ears also is desirable. The crib for soft corn should not be more than six or seven feet wide and should have slatted sides and bottom. Ventilators should be installed to facilitate the escape of moisture from the corn. Special apparatus for the utilization of artificial heat should be used in many cases.

Health in Country and City

The city is best for the children and the country best for the elders, according to an investigation carried on by Prof. Howard Woolston of the University of Washington. In the country, he says, there is less success in checking communicable diseases. Degenerative processes are speeded up in the cities and age breaks under the pressure. In the country the diseases causing the highest mortality rates are typhoid, tuberculosis of the lungs, scarlet fever, nephritis, whooping cough, puerperal, diphtheria, and diarrhea in the order listed. His study showed the highest rates in the city to be caused by influenza, cancer, measles, diabetes, violence, heart disease, tuberculosis (various), and cerebral hemorrhage.

Insects Migrate From Apples to Potatoes

The small greenish insects known as leafhoppers which cause burning of potato vines in August are the same ones that were found on young apple trees earlier in the season, according to the New York State Agricultural Experiment Station. Soon after the potato plants appear above ground these

insects leave the apple trees and begin feeding and laying eggs on the potato vines and can be found in all stages of development on these plants for the rest of the season. The effect they produce, which used to be called tip-burn and is now called hopperburn, was once thought to be caused by dry weather. These insects can be held in check by 3 or 4 applications of a spray made of 5 pounds of copper sulphate, 10 pounds of lime, 2½ pounds of powdered lead arsenate, and 50 gallons of water. The spraying must be done from the undersides of the leaves as that is where the insects congregate.

Strawberry Fertilization

That a properly balanced fertilizer for strawberries will pay good returns was shown by a demonstration in Duplin county, North Carolina. In this demonstration, conducted by E. B. Morrow, Extension Horticulturist, and County Agent L. L. McLendon, a 9-3-8 fertilizer was used in comparison with the fertilizers formerly used by the growers. Plots of 1/20 of an acre with check plots were used. The average yield of the plots getting the 9-3-8 fertilizer was 140.1 quarts compared with 98.4 quarts from the others. This was an increase of 26 crates per acre in favor of the recommended fertilizer.

Airplane to Fight Sugar Cane Insect

Experiments to test the effectiveness of dusting sugar cane against the sugar cane moth borer were begun in Illinois August 1 under the direction of the U. S. Department of Agriculture and in cooperation with the American Sugar Cane League, planters, manufacturers and bankers. Fifty thousand dollars it to be expended in this work. At the present time the effective control of the borer consists in submerging seed cane in water for 72 hours before planting. It is hoped that airplane dusting with sodium fluosilicate will prove equally effective and more economical. One dusting was given about August 1, another September 1, and a third one will be given October 1.

Sweet Clover Accused

Sweet clover, long praised for having brought itself up from the position of roadside bum into the society of respectable money crops, is now accused by the plant criminologists of being responsible for the deaths of cattle. The experiment stations of Minnesota, and Ohio have found that sweet clover hay when fed continuously and in large amounts causes internal hemorrhages and death. Young cattle seem to be the most susceptible. The North Dakota station says that only spoiled sweet clover hay will cause the trouble, and gives blood transfusion as the best cure. Both the Ohio and Minnesota investigators believe that any sweet clover hay, good or bad, will cause the poisoning if fed to young stock in large quantities. Bacteria in the hay are thought to cause the hemorrhages.

In Ohio it is thought farmers will have no trouble with this valuable feed if they use it as pasture, or mix the hay with other kinds and feed it lightly.

Spray or Dust

In a recent Minnesota test of the relative merits of spraying and dusting for potatoes the spray gave its dust to the dust. The spray seemed to have a decided advantage in reducing the losses from insect pests. All the plots, which were planted to Bliss Triumph and Green Mountain, were sprayed or dusted four times and there were check plots on which neither spray nor dust was used. The average increase over the check plots was 57 bushels for the sprayed plots and 20 bushels for the dusted plots the first year. The next year the advantage in favor of the sprayed plots was 19 bushels and for the dusted ones 6½ bushels.

A gang of cultivators operating in a South African cotton field. Note the fine soil tilth, the even stand, and the strong development of fruiting branches. This crop was thinned at the right time and yielded heavily. Note the oxen and type of labor.

South African COTTON

By H. E. Andries

Umbogintwini, Natal, South Africa

¶ *How the other side of the world grows cotton*

THE Union of South Africa, it must be made clear at the outset, is a comparatively small producer among the world's suppliers of cotton. Within the country itself, cotton growing is still an infant industry. Of the 90,000 farmers and companies actively engaged in farming in the Union, not more than 5,000 are growing cotton on a commercial scale, that is on upwards of 30 acres, whilst the largest area under one control at present is 20,000 acres. Yields vary all the way from 250 pounds of

seed-cotton per acre to as high as 1,500 pounds per acre with an average yield around 350 pounds of seed cotton per acre.

The high yield recorded above was grown during the 1924-25 season on a 200-acre block, and represented a phenomenally good crop. The grower secured 14.50 pence (29 cents) per pound for his lint and 4 pence (8 cents) per pound for the greater part of his seed for planting purposes. Less than 200 miles away in other parts of the cotton belt, however, planters suffered the loss of their entire crops as a result of excessive rains at the commencement of the picking season. No less than 40 inches fell during March, 1925, in these districts just when the crop was in the first flush.

The crop has been grown seriously during the last six years only, and it is natural that farming methods are still in the process of evolution.

The approximate acreage planted during the 1924-25 season was 64,000 acres, and during the 1925-26 season 90,000 acres, whereas the estimated potential cotton acreage is over 4,000,000 acres. It is considered that the achievable wealth of the future cotton fields of South Africa will far exceed that of the gold mines of the Rand.

The difficulties that have hampered in the past the development of the industry have been:

(1) Impure seed, from which was produced a staple lacking in uniformity and consequently in poor demand;

(2) Lack of reliable information on the growing of the crop, due in a large measure to lack of organization within the industry;

(3) Transport difficulties (the best cotton-growing territories have been badly served by railways and roads. Many of these territories have been malarious and practically uninhabited).

(4) Grading, ginning, and marketing facilities have been inadequate, and prior to 1918 were practically nonexistent.

In 1918, however, the Union Government inaugurated a specialized Cotton Division of the Department of Agriculture to take over all previous and existing work on cotton, and to conduct intensive research on the growing of the crop. This Division is today able to teach farmers along sound lines, based on those methods that have been found most reliable on its experimental stations. In addition its field staff organizes cooperative experimental investigations on representative forms in each district.

Cultivating South African cotton with an ox-drawn spring tooth harrow. The work is done across the rows which gives fine tilth and does no permanent, if any, damage to the cotton crop.

The Empire Cotton Growing Corporation (a body with the development of cotton growing within the British Empire as its

(*Turn to P.* 46)

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

Analysis 2-12-2 and analysis 0-12-2 developed more primary and secondary roots on corn plants than did acid phosphate used alone. This is one of the outstanding results among others obtained as the result of experimental work to determine "Some Effects of Method of Application of Fertilizers on Corn and Soils" by Frederick B. Smith, Agricultural Experiment Station, Iowa. The results of the work were published in Research Bulletin No. 104.

As the author points out, the amount of root growth is of vital importance to the corn crop. He states that early growth, early maturity, increased yields, and quality are correlated with the root growth. The fertilizers, therefore, that produce the biggest root growth are of vital importance. Of equal importance is the method of applying the fertilizers. Experiments were conducted in a greenhouse and field with fertilizers in various amounts, from 100 to 300 pounds per acre, applied in contact with the seed, at the sides of the seed, below the seed, and in the hill mixed with the soil. All these methods were compared with corn grown on check plots. The author states that it seems we have to conclude from these studies . . . that the best effect of fertilizers are obtained when the fertilizers are applied in the hill properly mixed with the soil. By this method the greatest development of both the primary and secondary roots was obtained.

In greenhouse experiments the fertilizers used in the hill mixed with the soil decreased the production of nitrate and lowered the nitrifying power of the soil for two weeks after the fertilizers were applied. With the present corn crop only 60 per cent of normal and the use of fertilizers increasing on corn, this research work contributes valuable and practical information on both the effect of fertilizers and, particularly, the method of application which would tend to act as an insurance against poor stands of corn.

Soils

"Properties of the Colloidal Soil Material," U. S. D. A., Washington, D. C., Dept. Bul. 1452, Nov. 1926, M. S. Anderson and Sante Mattson.

Crops

New and interesting information can be found on almost every one of the major crops in the large assortment of bulletins which have appeared this month. Arkansas has two new bulletins on corn; Texas has two on cotton; the grain crops are well represented, and there are two new bulletins on strawberry culture.

"Corn Varieties in Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 217, June, 1927, C. K. McClelland.

"Strawberry Production and Marketing in Arkansas," Agr. Exp. Sta., Fayetteville, Ark., Bul. 218, June, 1927, C. O. Brannen and J. A. Dickey.

"Cultivation Experiments with Corn," Agr. Exp. Sta., Fayetteville, Ark., Bul. 219, June, 1927, Martin Nelson and C. K. McClelland.

"Apricots," Agr. Exp. Sta., Berkeley, Cal., Bul. 423, May, 1927, H. R. Wellman.

"Growing Flax in Kansas," Agr. Exp. Sta., Manhattan, Kans., Cir. 133, Apr., 1927, H. H. Laude and W. E. Grimes.

"Blackhull Wheat in Kansas," Agr. Exp. Sta., Manhattan, Kans., Bul. 241, June, 1927,

S. C. Salmon, C. O. Swanson and H. H. Laude.

Thirty-fourth Annual Report, July 1, 1925 to June 30, 1926, Agr. Exp. Sta., St. Paul, Minn., W. C. Coffey.

"Results of Seed and Legume Inoculant Inspection for 1926," Agr. Exp. Sta., New Brunswick, N. J., Bul. 447, Feb., 1927, Jessie G. Fiske.

"Sugar Beet Investigations," Agr. Exp. Sta., State College, N. M., Bul. 162, June, 1927, J. C. Overpeck.

"Protein Survey of the N. D. Wheat Crops of 1925 and 1926," Agr. Exp. Sta., Fargo, N. D., Bul. 208, Mch., 1927, C. E. Mangels, T. E. Stoa and Wm. Guy.

"Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, Vol. XII, No. 4, July-August, 1927, Whole No. 127.

"Apple Pollination Studies in Ohio," Agr. Exp. Sta., Wooster, Ohio, Bul. 404, Apr., 1927, Freeman S. Howlett.

"Varieties of Cotton for the Gulf Coastal Plains of Texas," Agr. Exp. Sta., College Station, Tex., Bul. 354, May, 1927, D. T. Killough and V. E. Hafner.

"The Effect of Spacing and Time of Thinning on the Yield, Growth, and Fruiting Characteristics of the Cotton Plant in 1925," Agr. Exp. Sta., College Station, Tex., Bul. 360, June, 1927, R. H. Stansel.

"Seeds and Plants Imported by the Office of Foreign Plant Introduction, Bureau of Plant Industry, During the Period from Jan. 1 to March 31, 1925," U. S. D. A., Washington, D. C., Inventory No. 82, June, 1927.

"Everbearing Strawberries," U. S. D. A., Washington, D. C., Farmers' Bul. 901, June 1927, Geo. M. Darrow.

"The Life History of Timothy," U. S. D. A., Washington, D. C., Dept. Bul. 1450, Mch., 1927, Morgan W. Evans.

"Experiments with Fall-Sown Oats in the South," U. S. D. A., Washington, D. C., Dept. Bul. 1481, May, 1927, T. R. Stanton.

"Soy Beans," U. S. D. A., Washington, D. C., Farmers' Bul. 1520, Apr., 1927, W. J. Morse.

American Potato Journal, Washington, D. C., Vol. IV, No. 7, July, 1927, Karl H. Fernow.

Economics

"Income to Iowa Agriculture 1920 to 1926," Agr. Exp. Sta., Ames, Iowa, Cir. 104, June, 1927, Knute Bjorka.

Diseases

"Raspberry Diseases in Iowa," Agr. Exp. Sta., Ames, Iowa, Cir. 105, June, 1927, J. E. Melhus and O. H. Elmer.

"Why a Cull Apple is a Cull," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 160, Feb. 1927, H. P. Gaston.

"Some Observations on Winter Injury in Utah Peach Orchards," Agr. Exp. Sta., Logan, Utah, Bul. 202, June, 1927, T. H. Abell.

South African Cotton

(*From Page* 44)

purpose) maintains five experimental stations and a seed-breeding station, each in charge of a highly-trained expert whose help and counsel is at the disposal of the growers in the neighborhood.

Enterprising commercial concerns, particularly ginners and manufacturers of fertilizers and insecticides, are giving valuable assistance to the cotton industry through their service departments. At least one such firm operates an up-to-date experimental farm.

Meanwhile several commercial and farmers' cooperative ginneries have been erected, and between them they are able to cope with the entire output of the country efficiently and rapidly. The building of new railways and roads has opened up important fresh cotton areas, and various land-settlement campaigns both in the Union and overseas, have populated them.

Government cotton graders and seed-cotton classifiers are now stationed at the principal ginning and selling areas; and at Durban (Port Natal) there is a well-established cotton market—the only one of its kind in the world—at which ginners, acting on behalf of their clients, sell on sample by public auction. These sales are well attended by English, continental, and oriental buyers; whilst facilities for the export of lint to Liverpool markets complete the needs of the industry which now holds great promise for the future.

The writer of this article recently had occasion to investigate the cultural methods adopted as standard by the biggest estate in the country (to which reference was made in the first paragraph of this review) and a brief summary of their practices will be given in next month's article.

(*Continued next month*)

Nevada

(*From Page* 16)

Carson, has large diversions above its point of gaging. A third, the Mokelumne, possesses only crest snow survey stations and depends for its low level estimates upon measurements in the South Yuba Basin, which is separated from it by the wide American Basin.

Yet out of 60 forecasts in the past 17 years for the entire six basins, 33 forecasts were within 10 per cent of the actual April-July run-off, while 16 were within 20 per cent. In the remaining 11, the maximum divergence between snow cover and run-off was 30.4 per cent.

In 1925-26, a year of heavy premature melting and run-off, still greater accuracy was attained by means of weighted estimates for high and low levels. For out of six forecasts, four (the West Walker, Carson, Tahoe, and Truckee) were within five per cent, while that for the South Yuba was 10.3 per cent, and for the Mokelumne within 18.5 per cent. The East Walker, greatly affected by large meadows above point of storage, deviated only seven per cent from the forecast.

Under the varying conditions of weather, accuracy within 10 per cent is considered highly satisfactory. However, low-level courses have now been organized to maintain this accuracy, or if possible, further to increase it.

The Soil Science Tour

(*From Page* 28)

quantities of American and Canadian soils have gone to many parts of Russia, carried there by Russia's diligent 19 delegates; a lot more has gone to Switzerland, to Germany, England, Holland, Hungary, Roumania, Poland, the Far East, and many other places, all to be stored until winter, when the great investigation of American soils can begin.

Showing the productive effects of irrigation in the Arkansas Valley, Colorado.

It is to be no superficial examination, for the soil scientists dug deep for their samples. Trenches were dug showing profiles and horizons (*see photographs*). Each of the soil horizons, *A*, *B*, and *C*, were all carefully measured, samples of each were taken, noted, wrapped, and labeled from the surface of North American Mother Earth to several feet down. Yes, the soil scientists of the world are going to get to the bottom of the great American land problem.

Why all this interest? What does it accomplish?—logical and natural questions. The reason is, briefly, in order to make any practical or scientific progress, thought and things must be classified. This is a classifying and classified age. The principle is used by all of us even when speaking of things in common use. Without classification, thought would be wild confusion.

Science is the great classifier. In line with this thought during the history of the ages, various attempts

have been made to classify soils. It is not a new subject. Cato classified soils.

The Newer Concept

INTEREST has recently been intensified in the genesis and classification of soils because the world of soil science has received the vigorous stimulus and challenge of a comprehensive and newer concept. The chief interest of the tour was, therefore, in this newer concept discussed in the following paragraphs. To what extent did it interpret and meet the soil conditions of all countries? Did all the scientists agree with its principles? Thus were provided the basis of sharp clashes of opinion—"the collision of mind with mind and knowledge with knowledge—" all of which shows that soil science at least is in a healthy, growing condition.

Broadly speaking, the older systems of soil classification had a distinctly geological basis. Soils were regarded "simply as the end products of rock weathering; in other words, geologic material, the ground, dirt, silt, loam, sand, clay, etc." But this idea provided no vital explanation of the relation between different great soil bodies; neither did the idea provide any basis for a comprehensive and natural scheme of soil classification or fundamental principles on which to found a separate soil science.

Contrasted with this older idea—the newer[1] concept is that soils are "natural dynamic bodies," not merely end products; dynamic bodies, the product of powerful soil forming forces which forces are constantly tending to produce mature soil bodies.

According to this concept, the chief forces are the "climatic and biotic forces." The development of this concept has led to one of the fundamental laws of soil genesis and classification "the law of the development of soil types on the earth's surface under the influence of climate."

As component parts of climate, rainfall and temperature are, of course, the chief factors. While in this concept, climate, and especially moisture, has been raised to a plane of fundamental importance in formulating the basis of a scientific concept of soil genesis and classification, all the other factors, as the land relief, vegetation, soil material, geological processes, soil and ground water, age, and the effects of human labor are also included as influences.

[1] For an exposition of this concept, see, "The Great Soil Groups of the World and Their Development" by Professor Doctor K. D. Glinka, Director of the Agricultural Institute, Leningrad. Translated from the German by C. F. Marbut, U. S. Department of Agriculture, 235 mimeographed pages. Edwards Brothers, Ann Arbor, Michigan, 1927.

Nearing Salt Lake City, Utah. Old lake levels.

A Proposed Basis

WHEN these forces act unhindered, particularly moisture and temperature, mature soil bodies are developed. Many soils are "young or immature"—others have been developed beyond the mature stage "postmature."

Using moisture as a basis, the exponents of this newer concept suggest that the classification of soils can be related to moisture, specifically: (1) optimum, (2) average, (3) moderate, (4) insufficient, (5) excessive, and (6) temporarily excessive moisture conditions. While this is a proposed basis and a phase of the newer concept, it is not necessarily accepted in every country. From an international view-point, soil genesis and classification are in a state of evolution, which varies considerably according to the contributions and the factors affecting the work in each country.[2] Hence the value of the Congress and the tour.

After leaving Corvallis, and on the way to Seattle.

The regions of moisture variation already noted exist, of course, in the United States. The tour passed over many of the soil bodies developed under the major variations of these factors. Typical developments of such soils were examined.

Several groups and types of soils formed under "average" or humid moisture conditions were examined during the eastern part of the tour, soils generally light in color. The Sassafras of the Coastal Plain, the Chester loam of the Piedmont, the Hagerstown and the Cecil soils further south are the best known.

The prairie soils were studied in many places in the Middle West States and Canada.

Soils still under a grass cover but formed under less rainfall than the prairies were examined particularly in central western Kansas. Still under a short grass cover, but formed under less rainfall than the last group, are the high plains soils still farther West.[3]

The Profile is Used

FINALLY the desert soils in many parts of the Southwest were examined. The Pacific Coast region is, of course, an epitome of nearly all soil-forming forces and types. Peat and muck soils, the class formed under "excessive" moisture conditions, were studied particularly at the Coon Creek Sand and Peat Experimental Fields in Minnesota. Of soils developed under moderate moisture conditions, the greatest interest was aroused by the search for a typical mature development of the black soils—Tschernosem (A Russian word meaning black soils of typical character. These soils are abundant in eastern Europe). The best developments of these black soils were found near Brandon and

[2] Regarding the United States, Dr. W. W. Weir, U. S. Bureau of Soils, in the Handbook of the First International Congress of Soil Science, states as follows: "The new concept of soils has changed the basis of soil classification of the Bureau of Soils. According to the old idea, the United States was divided physiographically into seven provinces and six regions, designating 13 major classes into which the soils of the States might be grouped. But this scheme of classification, having a geological basis, was found wanting when the genetic concept of soils was accepted by the Soil Survey." He points out that the next classifications suggested were on the basis of color, and finally, it has been suggested that the soils of the United States may be classed into 7 broad groups. (See soil surveys and reports.)

[3] Certain essential differences exist between the soils in eastern Europe and North America; in Russia, for instance, changes in temperature and rainfall are in parallel lines; on the other hand, in North America the rainfall decreases from the East to the West, and the temperature increases from the North to the South. This difference in climatic conditions tends to produce a greater variety of soils in North America.

Saskatoon, Canada, and in the North Central States.

As the basis of soil study in the field the profile was used. A profile is "everything presented to the eye in a vertical cut through the soil exposing its various horizons." This soil picture requires special care in its examination. As one scientist said, "A day to each profile." The reason is that the various soil substances may have been tansferred from one horizon to another "partly due to chemical and partly due to mechanical action." These substances consist chiefly of salts, colloids, humus, iron, water; and especially are carbonates looked for. In one of the photographs of a trench, a man will be observed with an acid bottle, testing the profile for carbonates.[4]

To sum up, soil science with its modern content, the investigation of natural forces in their relationship to natural dynamic bodies, as such bodies are developed over the face of all the earth, reflects and vitalizes the philosophical concept, how all things "live, and work, and ever blending, weave one vast whole."

Whether the newer concept is fully accepted or not, the tour provided a much needed opportunity to discuss the principles involved and to make essential field observations. It provided happy opportunities for soil sampling and a magnificent stimulus to a world embracing view-point.

Of What Value?

OF what value are such studies? Briefly, to rationalize agriculture. By a study of the soil profile, sounder knowledge is obtained of the changes occurring in the soil, in the iron, organic matter, carbonates, colloids, etc. This knowledge serves as a sounder basis for soil management and for interpreting fertilizer experiments and plant nutrition work. From a national view-point, such a knowledge rationalizes agriculture in economic land utilization and crop production and from an international view-point, it enables the research work of one country to be better understood and applied in another.

However, soil profiles were not the only things studied. Soil utilization, crop production, and agricultural industries came in for a large share of interest. Major subjects in this field were the results of fertilizer experiments on cotton in the South, citrus in California, and corn in the North. Methods of irrigation were a source of much interest, especially in the Askansas Valley, Colorado, and at Riverside, California. The methods of treating alkali soils to make them productive were particularly observed at Fresno, California. The use of lysimeters and results obtained were studied at Knoxville, Tennessee. Results of plant breeding, especially on the small grains, were studied throughout the West and Canada. Farm machinery was observed in Kansas, Colorado, and other places in the West. Various agricultural industries of interest to smaller groups were visited.

Also much interest was taken in the forest laboratories and nurseries at Saskatoon, Canada, and Madison, Wisconsin. The latter place was visited on a side trip by those interested in forestry.

The pictorial resume in this issue shows some of these things. All the photographs are, of course, typical of regions covering several states or provinces. For instance, the North Carolina and Tennessee views are typical of the Piedmont and mountain sections of the route through Virginia and Georgia; the Georgia farm scene, of farms in Alabama and Mississippi; the Missouri picture of parts of the Middle West.

The Nevada scene is a typical view

[4] In countries of wide ranges of climatic variation as in Russia and the United States, in addition to laboratory methods, the morphological characteristics of the soil profile assume a high degree of importance in field examinations. In countries of narrow climatic range, where the temperature and rainfall do not vary greatly, there is a tendency to regard the morphological characteristics as of less importance and to stress laboratory methods of examining samples of the profile.

of some of the arid parts of the Southwest, much of which is irrigated in Nevada, Utah, and California, making fertile and valuable fruit and general farms. For instance, the citrus groves in the background of the California picture are irrigated. Fine irrigated farms were also visited near Las Vegas, Nevada.

The mountain views typify the magnificent scenery of much of the Pacific Coast, particularly of the northern part in Oregon, Washington, and western Canada. A small picture in the text gives a view of one of the charming and fertile valleys, typical of Oregon and Washington.

The North Dakota, Iowa, and Kansas scenes typify the great plains and prairies. The last photograph, Indiana, shows the party making one of the last soil examinations of the tour.

In Rome

THE "real story of the First International Congress of Soil Science and the tour that followed starts more than three years ago, on a hot day in May, 1924, in the ancient city of Rome. A group of distinguished scientists, representing more than one half of the nations of the world, listened to a report of the Committee on the Organization of the International Society of Soil Science." It was then recommended that the first Congress be held in Washington, U. S. A.

In November, 1925, the members of the American Organizing Committee were appointed in Chicago. On June 9, 1927, the first of the groups of delegates arrived in the United States.

Dr. Asher Hobson and a group of officials representing 12 European countries accompanied the tour. Dr. Hobson is the permanent United States delegate to the International Institute of Agriculture at Rome. The party afterwards participated in the Country Life Conference at East Lansing, Michigan, August 1 to 6.

Two enterprising county agricultural agents also accompanied the excursion over a very large part of the way. These two agents were A. W. Klemme of Lawrence county and Ira Drymon, Jackson county, Missouri. Their foresight and energy made it possible for them to obtain a broader vision of the agriculture of this country and a better knowledge of how things are done abroad.

In retrospect, the outstanding characteristics of the tour were the fine accord and mutual good feeling, one to the other, to the good people that entertained the party and to the discussions on the variety of interpretations that scientific investigations are so apt to develop.

The Daily Paper

SOMETHING of this spirit and accord is shown by a few selections taken from the paper "Boden Bull," published daily by the members of the excursion while on the train. Different delegations or groups took charge of such duties each day. A typical complete title was:

BODEN BULL

Published on Board the S. S. Pedologia
"The Truth As We Economise It"

though the truth was idealized daily, according to the taste of the groups editing it.

Speaking of soil profiles the following was published in BODEN BULL *No. 7 on July* 1, while somewhere in Kansas:

"CHANSON

To C. F. Marbut in homage.

Sing a song of profiles, sing with heart and soul,
Four and twenty Russians crowded in a hole,
Trowels, bags, and acid bottles, filling every chink,
Stremme, Treitz, and Marbut, dancing on the brink."

Again in BODEN BULL *No.* 19, *July* 13; Alberta, Canada:

"The truth at last,"
by 4 Englishmen
"TODAY'S PROFILES

We are now able to give an authoritative description of the Edmonton profiles, to wit, a tshernosiomoid rendzina with a strongly podsolized 'Glei' horizon, lateritised by infiltration from the

Foreign Delegates

Brazil
MR. A. B. FAGUNDES

Canada
PROF. H. M. NAGANT
MR. F. A. WYATT

Chile
MR. A. MATTHEI

Cuba
MR. A. BONAZZI
MR. C. N. AGETON

Czechoslovakia
PROF. and MRS. VACLAV NOVAK
DR. LADISLAV SMOLIK

Danzig
DR. H. STREMME

Denmark
DR. J. H. BLOM
MR. S. T. JENSEN
MR. V. C. MADSEN
PROF. FR. WEIS

Germany
DR. E. SCHUSTER
PROF. R. ALBERT
PROF. R. GANSSEN
PROF. G. KRAUSS
PROF. O. LEMMERMANN
PROF. and MRS. H. NIKLAS
PROF. A. PENCK
PROF. F. SCHUCHT
DR. M. C. TRENEL
PROF. W. WOLFF

Great Britain
PROF. N. M. COMBER
DR. E. M. CROWTHER
MR. JAMES HENDRICK
SIR E. JOHN RUSSELL
DR. B. A. KEEN
DR. W. G. OGG
MR. G. W. ROBINSON

Holland
MR. J. G. BYL
DR. F. C. GERRETSEN
DR. D. J. HISSINK

Hungary
DR. and MRS. LOUIS KREYBIG
PROF. A. A. J. DE'SIGMOND
MR. P. TREITZ

India
MR. P. G. KRISHNA

Italy
PROF. G. PERONI

Japan
PROF. T. IMASEKI
PROF. A. ITANO
PROF. H. MISU

Mexico
MR. M. MESA

New Zealand
MR. T. RIGG

Norway
PROF. K. O. BJORLYKKE

Palestine
DR. F. MENCHIKOVSKY
DR. A. REIFENBERG
DR. M. WINNIK

Poland
PROF. M. GORSKI
DR. S. MIKLASZEWSKI
PROF. F. TERLIKOWSKI
MME. DR. JADWIGA ZIEMIZCKA

Roumania
PROF. N. FLOROV
PROF. T. SAIDEL

Russia
MR. T. AFANASSIEFF
MR. K. D. GLINKA
MR. W. GEMMERLING
PROF. A. T. KAIGORODOV
MR. S. KRAVKOV
MR. A. F. LEBEDEFF
MR. S. NEUSTRUEV
DR. B. POLYNOV
MR. L. PRASSOLOV
PROF. A. SCHMUCK
MR. A. SHOORIGIN
MR. A. SOKOLOVSKY
MR. A. TARILOV
MR. J. TJURIN
MR. N. M. TULAIKOV
MR. P. TURIN
PROF. D. VILENSKY
PROF. E. E. USPENSKY
PROF. S. A. ZAHAROV

Sweden
MR. A. ASLANDER
MR. H. HESSELMAN
DR. E. MELIN
MR. H. OSVALD

Switzerland
DR. H. GESSNER
MR. O. J. GIRSBERGER
MR. E. NAEF
DR. H. SCHILDKNECHT
PROF. GEO. WIEGNER

Union of South Africa
PROF. T. D. HALL

calcium carbonate horizon.

Any inaccuracies in this description are due to the fact that the trench was only large enough to accommodate the Dutch delegation."

BODEN BULL *No.* 8, was called the *German Lunch Counter Evening Edition.* From that is noted:

"The pen of the most famous editor wouldn't be able to describe the longing of the German heart for a glass of Munich beer. Nevertheless, some people became already accustomed to Coca Cola.

"Mr. R. Krauss and others didn't feel very comfortable going down by automobile, for the driver talked with the crowd, not minding the dangerous curves —after all, we are satisfied with a day of rest without soil science and discussions, for Life is not science alone."

All of which shows that soil scientists are thoroughly human.

Another item:

During the excursion the reporter noticed that there were some disagreements about soil types, but the antagonism was later on leached out in the swimming pool.

The same Pullman car porters traveled the whole journey. An item is taken from BODEN BULL *No.* 13:

"Bob Elliot of Car 5 was asked if he was in command of a freight train or just an ordinary baggage car.

" 'No, Siree, this car am a shoe factory.' "

From BODEN BULL *No.* 18, *July* 12, while on the Pacific Coast, the following is noted:

OVERHEARD IN A RAILWAY STATION

Traveller to gateman at railway station, "What is all this fuss about?"

Gateman, "Oh, a bunch of seasiders from the North and a bunch of dirt diggers from the South."

Such is one railroad man's opinion of soil scientists. In any case the scientists published it about themselves, the purpose of this remark being of course, to show that soil scientists do have a sense of humor.

Finally, in BODEN BULL *No.* 26, on July 21 was printed:

"With the end of this unique excursion close at hand, all the foreign delegates and visitors are most anxious to tell their American friends how much they have enjoyed this tour. It has been an unforgettable experience and it would be impossible to select any one side of it as the best. Suffice it to say that in the breadth of vision and the warm hearted welcome of the American Organizing Committee and of all the people of the United States and Canada, who went out of their way to entertain us, they have set a characteristically high standard for future conferences. The friendships formed in Rome, Groningen, Hungary, and elsewhere have been renewed, and friends, through the columns of Boden Bull, we all say from the bottom of our hearts—Thank you."

The following day the tour returned safely to Washington at noon.

Thus was brought to a close a gathering of unique significance. The Congress and tour will be a milestone in the history of soil science. But, as is true always, as such studies and meetings enlarge the sphere of our knowledge, so they enlarge the sphere of our ignorance. Individually we become aware of further fields of knowledge of which we know but little. After such field travels there creeps into our minds something of the questioning spirit as in Obermann, "But now the old is out of date, the new is not yet born."

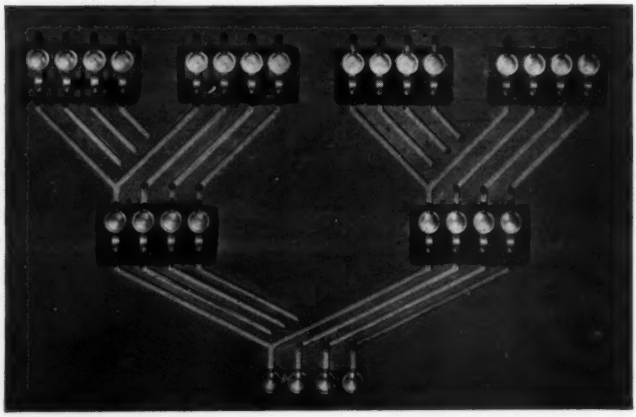
Thus, such a tour to delve into the why and wherefore of natural dynamic bodies and natural forces and classify them for man's use is only an enrichment, as we bring the proper mental and temperamental interpretation to bear upon their manifold meanings and phases. It was something of this essential spirit, as much as exact knowledge, that was the significant accomplishment. The natural sciences yield much to questioning, but they demand much over long years of time if any progress is to be made in knowing and understanding them, for are not the words of the Astronomer—poet of Persia, of true significance:

"And the first Morning of Creation wrote,
What the Last Dawn of Reckoning shall read."

Herediscope

(*From Page* 17)

times, it is possible to see how certain characters may be transmitted from generation to generation, or how they may be lost entirely, or how they may be covered up by dominant characters, and how they may reappear when the dominant characters are missing.



This view of the "herediscope" shows the connecting mechanism or channels by which the colored balls travel from one cup to the other. The apparently incomplete channels make their connection with the cups toward which they are headed by means of channel-bridges back of the channels they cross.

The Proved Sire

THE machine, as at present constructed, illustrates the transmission and recombinations of four separate characters, or it will illustrate the transmission of four multiple factors, in such types of inheritance as milk yield, egg yield, or stature.

Mr. Graves thinks that the average dairyman does not realize the importance of the proved sire, but he believes that an illustrated lesson with the herediscope would make him see why the proved sire is the most certain and speediest means of developing high production in dairy cattle.

He says that inheritance is such a complex study that the average person needs some easy and convincing demonstration. Another reason given for using a machine, such as the herediscope, is that it is extremely difficult for those versed in heredity to write or lecture on it so that it will be understood by the layman.

So far there is only one of these machines in existence. Some of the mechanical features were designed by K. E. Parks and it was built by G. F. Betts. Mr. Graves thinks it may be possible to simplify the mechanism so that herediscopes can be produced without excessive cost and small enough to permit their use in places where county agents or extension workers often find it necessary to give talks on inheritance.

Cows Fool Farmers

COW testing associations have proved to thousands of farmers that they are often poor guessers of the producing capacity of cows, but it is not often that this sort of failure can be demonstrated in a wholesale manner. At a meeting of the Tulsa (Oklahoma) Milk Producers Cooperative Association, 700 persons were asked to pick the better producer of two cows. Eighty per cent of them selected a cow with a record of 255 pounds of butterfat a year as the better one. The other cow had a record of 452 pounds of butterfat.

Fruits, Nuts, and Fertilizers

(*From Page* 12)

ever, this formula was not so successful, although where used the crop was good, fruit large, high colored, and very sweet. At the same time the peaches were unusually firm and lacked juiciness, making it difficult to remove the pit when being prepared for canning. But with the addition of three per cent nitrogen to the fertilizer, this deficiency in juice was overcome and the removal of the pit easily accomplished. Walker also has found by using fertilizers high in phosphoric acid and potash on his cling peaches that the fruit produced was decidedly higher colored and much plumper than that from trees where these two ingredients had been omitted.

Apples and Walnuts

ONE Delicious apple tree, reserved for home use, had been well supplied with manure, had had sufficient water, and otherwise was well cared for in every respect. Yet the tree was unthrifty, the fruit off in color, being a light greenish yellow, and affected with an internal browning which developed before the fruit was ready to pick. The apples were bitter in flavor and so worthless that Walker had about decided to dig the tree out. However, as a last resort, he gave this tree an application of twelve pounds of his favorite 3-10-10.

The improvement following this treatment was marked the first year in both tree and fruit, the tree becoming healthy and vigorous; the fruit growing to unusually large sizes, entirely free from internal browning, sweet, and delicious in flavor as well as in name. The fruit, instead of being a pale yellow as in the past, was a rich golden color with dark red cheeks characteristic of the Delicious apple when at its best. An examination of this tree showed it to be in a perfectly healthy and thrifty condition, and judging from the abundance of sturdy fruit spurs and plump bloom buds, this tree will carry another heavy crop of fine fruit this year.

Where Walker had used this 3-10-10 fertilizer, at the rate of not less than 15 pounds per tree, on 15-year-old Franquette walnuts, he noted a decided improvement in the foliage and general appearance of the trees. The nuts grew very large and were well filled out with particularly fine flavored white meats, and particularly free from discolored meats known to the trade as ambers. These nuts, when graded, ran to large and jumbo sizes. Nuts from the unfertilized trees ran to smaller sizes with many shrunken kernels. These, owing to the poor color of the meats, were classed by the trade as ambers, which meant a considerable reduction in price.

Mr. Walker, in the light of his own experience, scoffs at the prevalent idea that walnuts will not respond to the use of fertilizers. In connection with this, he spoke of the large well filled nuts his trees produced when they first came into bearing as compared with the smaller sizes with many shrunken and discolored meats produced by the trees as they grew older. But when these older trees were fertilized with his favorite 3-10-10 fertilizer, the size and quality of the nuts immediately began to improve, becoming as good, if not better, than any the trees had produced in the past.

"Old men," reads a scolding editorial, "are too frisky these days. Too many of the doddering fools consider themselves romantic figures." Why not? After all, a man's only old once.

It all depends on the point of view. Doubtless, parrots marvel at the way humans imitate their speech.

The County Agent

(*From Page 7*)

Sweet Clover 10 years ago was commonly considered a wayside weed and a nuisance in most localities. Its only recognized economic importance was as a bee pasture. In a few localities, principally in the hill countries of northern Kentucky and the lime belt of Alabama and Mississippi, sweet clover was grown to a limited extent as a hay crop and for pasture. County agents were induced to try the crop, and many of the tests were successful; the information was passed from one agent to another; the number of demonstrations increased, and the attitude of farmers toward the plant changed. Sweet clover now is a standard forage crop.

Valuable work has been done by the county agents in combating rodent pests, by organizing poison campaigns against prairie dogs, ground squirrels, and other rodents. In 1924 alone 833 tons of poison grain were distributed, in addition to 100,000 pounds of carbon bisulfide and 175,000 pounds of calcium cyanide used for fumigating burrows. Estimated savings in that year amounted to $4,000,000 as a result of the campaigns.

Stopping Soil Losses

TERRACING has been used for centuries in China, Japan and other countries where every foot of land must be utilized to its fullest extent. But only within recent years has terracing been practiced for agricultural purposes in the United States. It is the result of attempts to stop or decrease the large soil loss on the single crop humus depleted lands of the South. In almost every county in the southern states terracing has been a standard county agent project during the past 10 years. The work has spread recently into Ohio, Indiana, Illinois, Missouri, and other states.

Other projects in which county agents have played an important part include tick eradication, the fight against hog cholera, the control of tuberculosis and blackleg, and herd improvement. When the Federal Government organized tick eradication work, the era infested with the parasites was 741,515 square miles, and it was estimated that the tick was effecting a loss of $40,000,000 annually to southern farmers. Since 1915 more than 12,000 dipping vats have been built, largely through the efforts of county agents. When the tick eradication work was undertaken in 1916, some 975 counties were included in the quarantined territory, of which 693 had been released in 1923.

Hog auction sales in California are said to afford an excellent example of the relations of agents to marketing enterprises. The sales were started in 1916 by G. C. Kreutzer, county agricultural agent in Kern county, modeled on a plan that he had seen successfully worked out in Australia. The plan was to select a small town in a county where market facilities were available, procure enough hogs from producers of the district, set the date for the sale far enough in advance so that the packing concerns could be notified, have buyers on hand, obtain an auctioneer, and then advertise the sale to each farmer in the county. The plan proved so successful that other counties in the valley adopted it.

Summing Up

WILLIAM A. LLOYD, in charge of county agent work in the western states, office of cooperative extension work, sums up the achievements of county agricultural agent work as follows:

"It has saved a great industry in the Southern States and brought to agriculture in that region a measure of stabilization and diversification.

"It has brought new crops and new livestock enterprises to various regions of the country adapted to them.

"It has aided in mitigating the losses due to livestock and plant disease and to insect and rodent pests.

"It has helped to conserve soil fertility and to prevent soil wasting.

"It has brought about a standardzation of breeds of livestock and varieties of crops.

"It has in a thousand ways modified farm practices to the individual benefit of the farmer.

"It has aided farmers in solving their marketing problems and in bettering their economic conditions.

"In a great national emergency it was the effective agency in organizing American farmers to make their best and largest contribution to the cause of human liberty.

"Important as are these accomplishments, it has done something else. It has lifted the farmer out of his isolation and brought him into working relation with his fellow farmers and his agricultural institutions—the state college of agriculture and the United States Department of Agriculture—without destroying his individualism, which is his tower of strength.

"It has left him still independent, still self-reliant, but more tolerant and with more community consciousness. It has developed a new leadership in country affairs. Through common counsel and mutual helpfulness among fellow farmers in connection with the simple problems of his workaday life, it has developed cooperativeness of spirit which is fundamental to the more complex, more difficult association in business. It is placing at the farmer's disposal a better organization of facts by means of which he is doing more accurate thinking, reaching safer conclusions, and living a more satisfactory life. It is not paternalism nor philanthropy but organized self help."

The Anti-Proverb League pridefully points out that Lindbergh couldn't possibly have had any success had he paid any attention to the familiar saw about the wisdom of keeping one's feet on the ground.

Unbending Backs in Farming

(*From Page* 11)

the carrier which is so fitted with a safety slip clutch that the movement of the apron is stopped in case it becomes clogged.

Saving of Labor

THE corn binder eliminates the back-bending process of hand-cutting. Having the corn bound in bundles of convenient size, also, helps to save time in the shocking and in the loading onto the wagon at silo filling time.

In some neighborhoods, the few farmers who do not have binders find it necessary to employ from four to eight men to cut the corn. As many as eight men may be seen in a field with corn knives the day before the silo is filled. The high cost of employing so large a number of men is not the only disadvantage of the plan, for when cut, untied in bundles, the loose stalks are hard to pick up from the ground, hard to load and unload from the wagon, and hard to get into the cutter.

Usually before silo filling, the corn binder is started a day ahead of filling. The contrast of a binder with one man and four horses against four to eight men cutting by hand, leaving the horses idling in the barn, speaks for itself.

Just as there is a proper time to plant and harvest all farm crops, there comes a time in the fall when corn

can most advantageously be harvested, that time varying with the needs—namely the silo, shredded corn, ear corn, etc. The binder makes it more possible to harvest effectively large areas of corn when the weather conditions are right.

To make improvement and to advance defines progress. For a farmer, progress means the use of any machine which can be profitably used to increase crops with a saving of time and energy. When farmers progress, they are striving for better methods of working, better ways of living, and the attainment of improvements which will help them to live, rather than merely to exist.

Good Farms from Blow Sands

(*From Page 22*)

An exciting moment at H. D. Boston's alfalfa auction.

clover pastured 13 head of as fine Guernsey cattle as can be found in the State from spring until the middle of July, when Jacklin turned them into an alfalfa cutting to allow the sweet clover to get its second breath. His corn was more than knee-high by the Fourth, which is unusual considering the long, cold, wet spring they had in Wisconsin this year. His alfalfa averaged two tons to the acre at first cutting and his barns were full. The second cutting went into stacks. In fact Jacklin is "alfalfa poor." He was considering plowing up the choicest kind of a three-year-old alfalfa field to put into corn for silage.

Across the road from the Jacklin place, a fine new farm residence is being built by a man who abandoned his farm several years ago to take up more remunerative employment in Chicago. Since he has seen what alfalfa is doing for Portage county, he has come back to his farm, has 10 acres of fine alfalfa seeding, and is on his way to rival his neighbor in making "milk flow where alfalfa grows."

South of the Jacklin place on the Jim Isherwood farm there now are about 40 acres of alfalfa growing on limed and fertilized soil. Mr. Isherwood has been one of the progressive alfalfa growers in this great soil-rebuilding project.

Down the road a bit there are 75 acres of a new alfalfa seeding put in by Boston this year. In July the little plants had their heads a good five inches above the white sand. The whole 75 acres were put in in a week's time, disking, dragging, rolling, seeding, and rolling. It was fertilized with

250 pounds to an acre of a commercial fertilizer analyzing 2-16-28.

Another field of 45 acres consisting of 8 acres of three-year-old, 15 two-year-old, and the rest one-year-old seedings had just been divided into five-acre strips so that each strip contained some of each seeding. These five-acre strips were auctioned off by Boston to the highest bidder. Farmers from 15 miles around came to see the alfalfa and observe this novel way of disposing of a hay crop. The bids ran from $13 to $14 an acre for the best lots and $8 to $9 for the poorest. Boston averaged $10.70 per acre on his hay without having to concern himself with any of the labor of making it.

County Agent Noble in talking about his alfalfa work, disclosed that in Portage county five years ago there were only 112 acres of the legume grown. Now some townships list more than 400 acres of the legume, and the total acreage for the county would run well over 4,500. Four carloads of muriate of potash were ordered for the county this spring.

"The fertilizer work on alfalfa in Portage county was started about four years ago, using a ready mixed commercial fertilizer containing only six per cent potash," Noble said. "Since that time we have been increasing the amount of potash used, and today the average recommendations are to apply from 125 to 200 pounds of muriate of potash per acre in addition to 75 to 125 pounds of treble super acid phosphate. Whether or not a small percentage of ammonium sulphate does any good when applied before seeding alfalfa, remains to be seen, and some of the mixtures contain two per cent.

A first cutting of two-ton per acre alfalfa on Harley Jacklin's sand farm.

Potash for the Blow Sands

"A FEW years ago, potash as a fertilizer on sand soils was practically unknown, but it had been used on the marsh south of Plover for the past 8 or 10 years. Three or four years ago the first applications of potash were made on real sand soils and due to the results obtained, the use of potash has increased so that this past season there were four carloads distributed to farmers in this county, and I would say that practically three-fourths of it were used on the lighter soil and the other part on the muck soil.

"We feel that in the lighter soil areas, where farmers are short of cattle due to the difficulty of producing sufficient hay crops, the use of commercial fertilizer should be encouraged," Noble continued. "Generally on this type of a farm there is hardly enough barnyard manure available to properly fertilize the corn and potatoes, and rather than use barnyard manure to get 5 or 10 acres of alfalfa started, it is better to use potash and phosphate on the alfalfa and to use the barnyard manure, the complete fertilizer, on such other crops as corn and potatoes. An aver-

age application of the commercial fertilizer, which most of the farmers mix at home, costs them from $6 to $9 per acre, which isn't any more than an application of barnyard manure.

That the banks are solidly behind County Agent Noble is evidenced by this large billboard on a federal highway.

"After the alfalfa has produced several crops, we find it beneficial to top-dress with commercial fertilizer including phosphate and potash. About every two years an application of about 150 pounds of potash, and 75 to 100 pounds of super acid phosphate has given good results, although some farmers use the potash alone. These fertilizers are being distributed either after the first or second cutting or late in the fall, although some have been applied very early in the spring."

Mr. Noble in cooperation with the State Soils department has conducted some experiments to find the most profitable fertilizer to use for growing alfalfa on these sandy soils. Tests were conducted on four different farms.

* * *

The test on Farm 1 showed that when 150 pounds of potash were used alone, there was a profit above the cost of the fertilizer of $6.75. When 200 pounds of phosphate, 45 per cent, were used alone the profit was 60c. When the two materials were combined, there was still a profit, though somewhat less than when potash alone was used. The following are Mr. Noble's figures:

FARM No. 1 (two cuttings)

Treatment	Cost of fertilizer	Weight of hay	Increase over blank	Value of Increase above cost of fertilizer Hay $15.00 per ton
Blank	.....	4765	....	.....
150 lb. potash	$3.75	6165	1400	$6.75
300 lb. potash	$7.50	6230	1465	$3.50
200 lb. 45% phosphate	$5.60	5590	825	$ .60
200 lb. 45% phosphate and 150 lb. potash	$9.35	6230	1465	$1.65

The test on Farm 2 showed that 150 pounds of potash used alone produced a profit, that there was no profit from phosphate used alone, and that the phosphate and potash used together also resulted in a loss.

FARM No. 2 (two cuttings)

Treatment	Cost of fertilizer	Weight of hay	Increase over blank	Value of Increase above cost of fertilizer Hay $15.00 per ton
Blank	.....	6000	....	.....
150 lb. potash	$3.75	7100	1100	$4.45
300 lb. potash	$7.50	7730	1730	$5.50
200 lb. 45% phosphate	$5.60	6650	650	—$ .72
200 lb. 45% phosphate and 150 lb. potash	$9.35	7200	1200	—$ .35

The test on Farm 3 showed the same thing, namely, that the potash produced

a profit. The phosphate alone was used at a loss. Figures are given below:

FARM No. 3 (two cuttings)

Treatment	Cost of fertilizer	Weight of hay	Increase over blank	Value of Increase above cost of fertilizer Hay $15.00 per ton
Check	.....	5090	....	.....
100 lb. potash	$2.50	6500	1410	$8.00
150 lb. phosphate	$4.13	5300	210	—$2.48
150 lb. phosphate and 100 lb. potash	$6.63	7565	2475	$11.93

On Farm 4, again 100 pounds of potash produced a profit, and in this test the phosphate also produced nearly as good a profit. The results will be found in the next table:

FARM No. 4 (one cutting).

Treatment	Cost of fertilizer	Weight of hay	Increase over blank	Value of Increase above cost of fertilizer Hay $15.00 per ton
Check	.....	2800	....	.....
100 lb. potash	$2.50	3500	700	$2.75
150 lb. 45% phosphate	$4.13	3650	850	$2.25
150 lb. 45% phosphate and 100 lb. potash	$6.63	4000	1200	$2.27

The above four tests show that potash is essential and profitable on these sands for maintaining the most profitable yield of alfalfa. Phosphates are also necessary. Too much phosphate, however, should not be used or the cost of the phosphate will reduce the profit on the fertilizer. Phosphates and potash can, of course, be procured in mixed fertilizers of a suitable analysis, that is, phosphates and potash alone with the potash equal to or more than the phosphates.

Fairs

(*From Page* 4)

of the soil depend entirely upon the Bingville Racing and Agricultural Society for their annual uplift.

One western state grudgingly doles out its biennial university budget of less than two million dollars and disposes of eighty per cent of the annual premiums paid at sixty county fairs with loud applause—and the latter amounts to half a million smackers a year. One-fourth as much for five weeks of county fairs as for two years of higher learning! Send the bull to the fair and the boy to the university, and see which wins!

THE United States supports some four thousand fairs and expositions in each and every blessed season, regardless of feast or famine. Canada holds many hundreds of them all year round. The list does not include the pageants and divertissements which self-conscious mushroom communities of the Sinclair Lewis type feel called upon to launch to commemorate some anniversary or dedication.

I have heard divers surmises as to the reason why the Sesqui-Centennial at Philadelphia in 1926 failed to draw the expected throngs. This is not so hard to answer.

Back in the days when our grandmothers dusted off their black alpaca gowns and packed the haircloth trunks to attend the great Centennial of 1876 at Fairmont park, the wide-flung reaches of the unwashed west had not succumbed to the expo ego. People had to seek far for the chance to become sophisticated. In those days Mahommed went to the mountain, but now the mountain, aided by the wireless, comes to Mahommed.

HAVE we then an overproduction of expos and a surplus of festivals beyond the needs of the appetite or the power of comfortable consumption?

This question is the same as the one so often and so irritatingly put to county agents and fertilizer men relative to the production of field crops.

My answer must be identical and based on the same line of logic as theirs. America demands quality fairs and quality foods. "Digestion waits on appetite and health on both," as Shakespeare remarked. Poor food and rotten fairs discourage consumption and limit production to a dead level of mediocrity.

America wants *more better fairs*, but would not be any wiser or happier with any increase of them based on selfish commercialism alone.

If this objective is not kept in mind it will take more than a surplus control act to salvage the ruins left in the wake of shattered buildings and bankrupt premium lists.

The gamble and hazard elements are always present in fair management. It is a race between Jupiter Pluvius and the casualty company.

Whether the word "fair" means "fair weather" or "fair treatment" is hard to settle sometimes. The average disappointed secretary whose grounds have been deluged declares it doesn't mean the former; while the tight-fisted exhibitor is equally emphatic that it cannot mean the latter—unless he chooses the judges.

"MUCH Ado About Midways" might form the title to a large chapter on recent fair history. Having indicated that fairs have experienced the need for thrift and protection from hazard and mishap, we have left another human element to consider—sanitation.

Dickens and Hogarth both picture for us in different mediums how the mountebank, the fakir, and the strolling entertainer usurped the places of vantage at the early English festivals. Dickens with kindly humor plays up Jarley's wax works with its van of horrors standing beside English hedgerows. Hogarth in rugged lines has left for us the cruel side of the picture in the Rake's Progress and similar sketches. In modified form we have had our clutter of arrant blacklegs to deal with at modern fairs, and probably shall for many moons.

At a state dairy show last fall I remember seeing a man with a rattlesnake on each arm selling pocket knives at the rate of five a minute. The said toad-stabbers wouldn't cut a cheese sandwich and were brittle and useless, but the crowd was true to Mr. Barnum's platitude.

And just two hundred yards away from that spot, the great lesson of vitamins for vigor was scarcely noticed, and the county agents' stock of bulletins—also "free for nothing"—was playing second fiddle.

DISPLAYS of equine and bovine type and form once suffered from the proximity of the Devilish Dancers or the Swimming Susans, but it seems of late that the normal, everyday sight of feminine underpinning we get has sort of checkmated the distracting influence of those old time leg shows.

No innocent Punch and Judy or strength testing machines ever hurt our agricultural fairs, but the public has pretty well got the number of the trashy aggregations that once led gypsy-like lives upon every fair park in rural America.

Now comes in a hopeful note in the outlook for putting on home talent, livestock and agricultural pageants and spectacles that will create more interest because the actors are known to the people, while the scenes they portray are not weak imitations of Roman pomp, but pictures of how Silas Smith built his log cabin on Cedar Creek and "fit" the Injuns to a standstill.

FAIRS have standardized their customs and premium lists, which but reflects the mania for regularity and uniformity pervading human effort. The livestock and field crops lists in particular have been overhauled by zealous college authorities, not without much lasting benefit in most cases.

It was not always thus. I recall as a lad driving a brindle cow of unknown antecedents to the county fair, followed by a red calf that could boast of being a native like myself, if nothing else. We had been importuned by the officious factotum of the fair to bring in "that nice fat old cow," and promised a prize ribbon and our names in the paper for our pains. I slept beside those unworthy creatures for five hot nights at the fair; but, unluckily, the judge was of the newer order, and old bossie and her humble offspring went home as innocent of fame as they came.

That was the beginning of the end for the farmer who imagined that he owned a good cow regardless of the herd-book. It removed many poor bovines from the ring, but it likewise robbed the fair of much of its ancient warmth and neighborly competition. We have gained much and lost much in the movement for standards.

The pumpkin alone has managed to survive the onslaught of the standardizers. In the pumpkin class size and the hint of aromatic New England kitchens survive to win, sans pedigree, sans records, classifications, or variety nomenclature. But pumpkin growers, beware; the vegetable improvers will yet hedge you roundabout with reservations and recommendations, and then the last entry list will be closed against the free-for-all in the annual harvest competition.

YOUTH at our fairs working under the emblem of the four-leaf clover marks the apex of worthy attractions rapidly being taken on by the expositions. If fairs were as faulty as could be and had no other redeeming features, the presence of Youth with a willing heart and an eager hand—brought there by the invitation of the exhibit board — would prove the salvation of them and the justification for our patronage.

You and I remember that when we found a four-leaf clover it meant a vague, haphazard piece of good luck, maybe never realized although hoped for with all the superstition of childhood.

Today the club leaders of America have transformed the four-leaf clover into a living sign. It imparts the finest traits of citizenship, and holds high the universal appeal of home, heart, hands, and health. Our fairs recognize this human tie that unites mankind in its love for youth, and youth attends the fairs to follow the trail to achievement in tasks that are both needful and noble.

With the bands of demonstrators and exhibitors representing Youth and Ambition clustered at our fairs, we need spend no time in fretting about the future of that phase of the expo business. It provides something we never had as boys and gives the elders plenty of room to inspect *their own* lives and achievements by contrast. It flatly gives the lie to the treasonable talk about decadent juveniles, and builds for us a coming generation of broad-minded farmers.

Be fair to the fairs. They must suit the public taste or fail. Let's see to it that we, the public, help set a higher standard—not for more fairs, but for *more better fairs.*

NEW ENGLAND SPEAKS

The latest Coolidge yarn to reach us is attributed to J. Allen Wallis, president of the Iowa Dairy Association. According to Allen, two lads were sitting on an old stone fence whittling. The late autumn sky was overcast and threatening. All was silent for a long time. Then one of the boys called to the other "Cal."

No response.

There was another whittling silence; then another call:

"Cal."

Still no response.

Then finally:

"Cal, I say, do you think it's going to rain or clear up?"

Once again the strange New England silence.

At last the boy addressed moved; slowly he turned toward his questioner.

"What are you trying to do?" he queried. "Pin me down?"—*Exchange.*

ONE ON PA

Father—When Abe Lincoln was your age he was making his own living.

Son—Yes, and when he was your age he was President.

This is Apple Week. Hurrah! An apple a day keeps the doctor away—unless you get the seeds in your appendix.—*Iowa State Green Gander.*

Flapper: "Where's the electrical department?"

Hardware Clerk (who was bowlegged): "Just walk this way, miss."

Flapper: "You fresh young thing! I'd die first."—*Catapult.*

COOPERATE

Ay tink Ay vill cooperate
Und help my neighbor out.
Ay can't get anyvere alone:
Dat's so vidout a doubt.

He needs my help, Ay needs hes, too,
Ve pull yust like a team—
Ven he kvits quarreling vid me
Und Ay kvits fighting heem.

Ve neighbors act yust like beeg fools
Ven ve each odder fight
Und say each odder von is wrong
Ven neider von is right.

Ve pull our loads dat easy
No vun will veel de weight—
Ven me und heem togeder vork
Und boat cooperate.

—*Exchange.*

Jack—That's a fine looking horse; but what's the idea of the two saddles?

Betty—That's the rumble seat.—*Judge.*

"Sweetheart, do you believe marriages are made in heaven?"

"Probably. Heaven only knows why some are made."—*Western Reserve Red Cat.*

"Do you know the pawnshop song?"

"No. What is it?"

"Ve Lentcha."—*Oregon Owl.*

When a mule runs away he stops and looks back as soon as he thinks he is out of danger. A horse runs until something smashes.

CAVEMAN STUFF

Mother sent little Harry to take his smaller sister safely to the kindergarten. He was back sooner than she expected.

"Well, dear," she said, "did you treat Mary like a little lady, as I asked you to?"

"Naw," replied the youngster disgustedly, "we canned that lady-and-gentleman stuff, an' I chased her most of the way."

New York-to-Paris—If Most of Us Tried It:

"I had to come down for gas. Is this near Paris?"

"No, you're about a mile and a half from Bloomfield, Indiana."—*Life.*

"Triplets," announced the nurse to the proud father.

"Really?" he said. "I can hardly believe my own census."—*Dartmouth Jack-o'-Lantern.*

SHE MISUNDERSTOOD

A stout woman drove up to a filling station.

"I want two quarts of oil," she said.

"What kind, heavy?" asked the attendant.

"Say, young man, don't get fresh with me," was the indignant response.

"Now, don't be unkind, Johnny! Forgive your little sister—why, she may die in the night, and then how would you feel?"

"All right, I forgive her. But if she's still alive tomorrow morning, she'll get it!"—*Ex.*

We know of instances where dads are working their son's way through college.—*Sickle and Sheaf.*

"What's become of the tattooed beauty?"

"She had her face lifted and it threw all her pictures out of focus."—*Vassar Vagabond.*

Potash Salts

Muriate of Potash.....80-85% KCl
Sulphate of Potash.....90-95% K_2SO_4
Sulphate of Potash-Magnesia.....48-53% K_2SO_4
Manure Salts.....30% K_2O
Manure Salts.....20% K_2O
Kainit.....14% K_2O
Kainit.....12.4% K_2O

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